

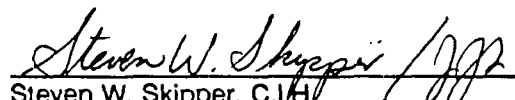
**MEDLEY FARM SITE
GAFFNEY, SOUTH CAROLINA**

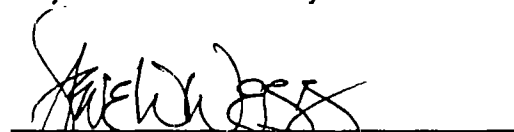
REMEDIAL DESIGN AND REMEDIAL ACTION

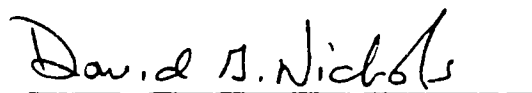
**CONSTRUCTION HEALTH AND
SAFETY/CONTINGENCY PLAN**

February 1994

***Prepared for the
Medley Farm Site Steering Committee***


Steven W. Skipper, C.I.H.
Project Health and Safety Coordinator


Steve W. Webb, Ph.D., P.E.
Project Manager


David G. Nichols, P.G.
Senior Consultant



10292870



RMT, Inc. -- GREENVILLE, SC
100 VERDAE BOULEVARD = 29607-3825
P.O. Box 16778 = 29606-6778
803/281-0030 = 803/281-0288 FAX

RESPONSIBILITIES

The Medley Farm Health and Safety Plan was initially developed to address the Remedial Investigation/Feasibility Study (RI/FS) conducted at the site. It has been subsequently revised to address Remedial Design/Remedial Action (RA) and RA Construction Activities that will be conducted at the site. The plan outlines responsibilities by project job assignments such as, Health and Safety Representative, Project Manager and others. The RMT personnel currently assigned to the project job assignments are specified below:

Senior Consultant - David G. Nichols, P.G.

Project Manager and RD/RA Coordinator - Steve W. Webb, Ph.D., P.E.

Health and Safety Coordinator - Steven W. Skipper, C.I.H.

Construction Manager - Fred R. Banker

Project Hydrogeologist - Mark A. Miesfeldt

Site Health and Safety Representative - As assigned by task

These applicable contacts may be reached at RMT's office telephone number (803) 281-0030.

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1. COORDINATION AND RESPONSIBILITY	1-1
2. SITE DESCRIPTION	2-1
3. PROJECT DESCRIPTION	3-1
4. HAZARD ASSESSMENT	4-1
4.1 General Chemical Hazards	4-1
4.2 Chemical Listing	4-1
4.3 Physical Hazards	4-16
4.3.1 Utilities	4-16
4.3.2 Heavy Equipment	4-16
4.3.3 Noise	4-16
4.3.4 Biological Hazards	4-17
5. QUALITATIVE RISK ANALYSIS	5-1
6. ENVIRONMENTAL MONITORING	6-1
7. REQUIRED PERSONAL PROTECTIVE EQUIPMENT (PPE)	7-1
8. HEAT/COLD STRESS PROTECTIVE MEASURES	8-1
8.1 Heat Stress	8-1
8.2 Cold Stress	8-2
9. ACCIDENT PREVENTION	9-1
10. STANDARD OPERATING SAFETY PROCEDURES AND CONTROLS	10-1
10.1 Drilling Safety	10-3
10.2 Adherence to Buddy System	10-3
11. DECONTAMINATION CONTROL MEASURES	11-1
11.1 Site Organization and Control	11-1
11.2 Exclusion Zone	11-1
11.3 Contamination Reduction Zone	11-2
11.4 Support Zone	11-2
11.5 Modifications to Site Control	11-3
11.6 Decontamination Procedures	11-3
11.7 Medical Emergencies	11-4
12. EMERGENCY EQUIPMENT	12-1

TABLE OF CONTENTS (Continued)

<u>Section</u>	<u>Page</u>
13. EMERGENCY AND CONTINGENCY PROCEDURES	13-1
13.1 General Emergency Procedures	13-1
13.2 Personal Injury	13-2
13.3 Chemical Exposure	13-2
13.4 Fire or Explosion	13-3
13.5 Emergency Contacts	13-3
13.6 Spill Control Contingency Plan	13-4
14. PERSONNEL TRAINING	14-1
15. MEDICAL SURVEILLANCE	15-1
16. RECORDKEEPING	16-1
16.1 Medical Surveillance	16-1
16.2 Training	16-1
16.3 Work Logs	16-1
16.4 Accident Reporting	16-2

List of Tables

Table 2-1	Ground Water Analyses at the Medley Farm Site	2-5
Table 4-1	Chemicals of Potential Concern	4-2
Table 4-2	Inhalation Exposure Limits	4-3
Table 7-1	Respiratory Protection Requirements	7-2
Table 7-2	Personal Protective Equipment Summary	7-3

List of Figures

Figure 2-1	Site Location Map	2-2
------------	-------------------	-----

List of Appendices

Appendix A	Material Safety Data Sheets (MSDSs)
Appendix B	Hospital Emergency Route Map

Section 1

COORDINATION AND RESPONSIBILITY

The Project Manager will not allow work to begin at the Site until this Health and Safety Plan has been provided to all field personnel. Before visiting the work site, all personnel must attend a briefing session, to be conducted by the Health and Safety Coordinator (HSC) or a designee, on the potential site hazards and specific requirements of this Health and Safety Plan, including training in the proper function and operations of all monitoring and personal protective equipment. The designated Site Health and Safety Representative (HSR) will be the senior field representative continually on site during any site activity and will be responsible for implementing the site-specific Health and Safety Plan during field operations. If there is any question whether an unplanned occurrence on site may compromise health and safety, the HSR has the authority to interrupt operations and to remove all personnel from the area. If practical, the Health and Safety Coordinator should be consulted before any operation is interrupted. If work is stopped due to any health and safety concern, immediate attention should be given by health and safety personnel, working in cooperation with the Project Manager, to identify and correct the cause of concern as quickly as possible. Any such incident will be fully documented by the HSR in a report to the Health and Safety Coordinator and Project Manager. In the event of a work stoppage, the client must be notified as soon as possible, and kept apprised of progress in resolving the incident until normal operations are resumed.

NOTE: REFER TO SECTION 13.5 FOR EMERGENCY TELEPHONE NUMBERS. THESE EMERGENCY CONTACTS AND NUMBERS WILL BE POSTED AT THE SITE DURING RA CONSTRUCTION WORK.

Section 2

SITE DESCRIPTION

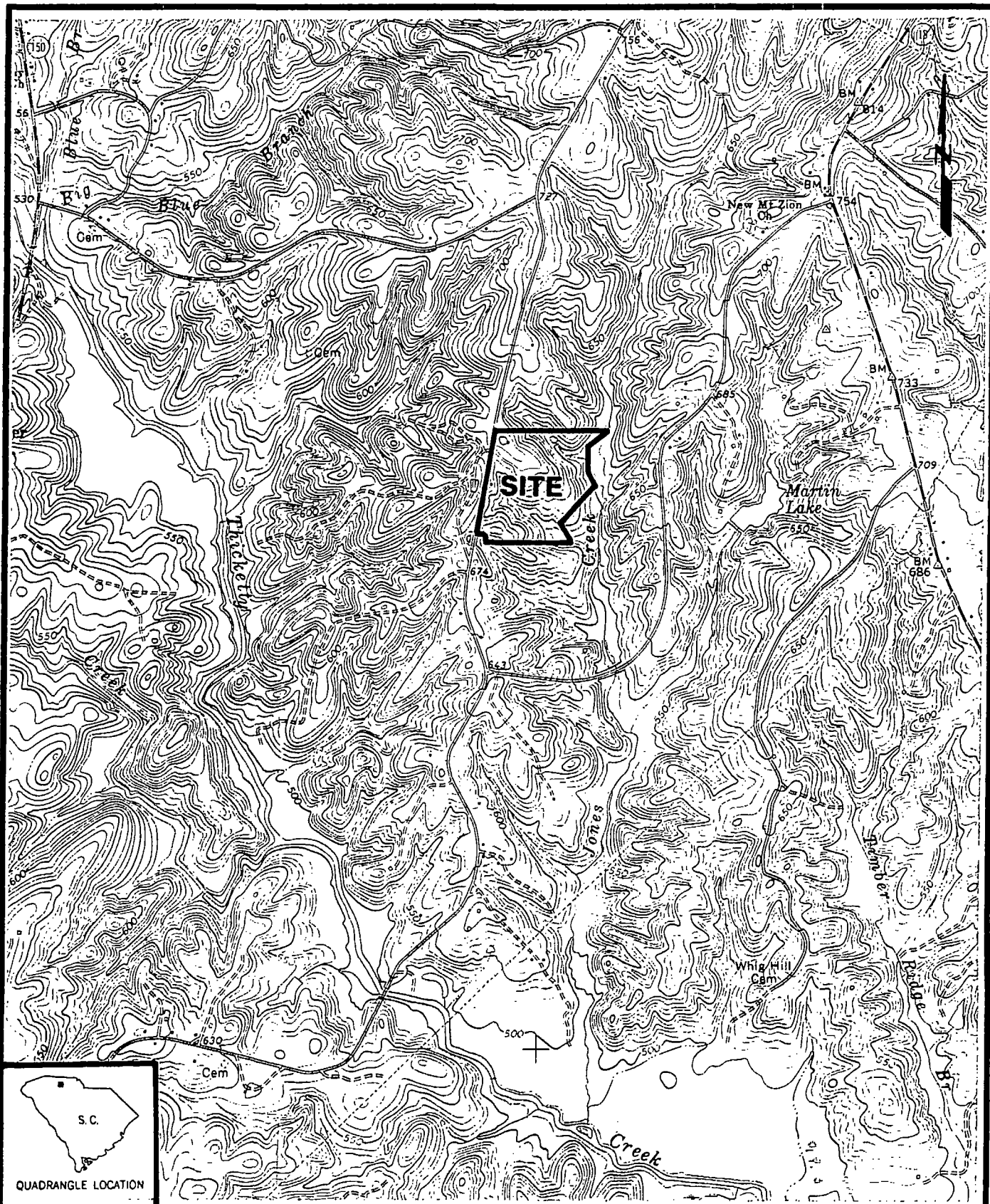
The Medley Farm property occupies 61.9 acres of rural land approximately six miles south of Gaffney, South Carolina in Cherokee County on County Road 72 (Burnt Gin Road). The approximate location of the site is shown in Figure 2-1. The Medley Farm site consists of an approximately 7-acre section of the Ralph Medley Farm parcel that is situated on top of a small hill. The approximate center of the site is located at latitude 34°58'54" north and longitude 81°40'2" west. The surrounding land is hilly and consists mainly of woods and pasture land. The land use in the vicinity of the site is primarily agricultural (farms and cattle) and light residential.

The Medley Farm site ranges in elevation from 680 to 700 feet above mean sea level. Topography of the site area is relatively flat but the adjacent land slopes off steeply to the east and south. Surface water drainage from the site flows into Jones Creek, located along the eastern property boundary. Jones Creek flows into Thicketty Creek which then drains into the Broad River.

The Medley (also known as Burnt Gin) Farm is owned by Ralph C. Medley, who acquired the property from William Medley in 1948. Prior to the mid-1970s, the site was maintained as woods and pasture land. Available information indicates that disposal of drummed and other waste materials began at the site in 1973. Waste disposal at the Medley site reportedly stopped in June 1976. At the time of the South Carolina Department of Health and Environmental Control (SC DHEC) inspection (conducted on May 3, 1983), approximately 2,000 55-gallon drums were stored on site in random fashion. Some drums were observed in open pits or in some of the six small lagoon areas.

Areas of distressed vegetation were noted in areas where drum storage may have occurred. In addition to the 55-gallon drums, there were several hundred smaller plastic containers of various sizes. Most of these containers were in a condition that markings were no longer visible. The actual contents of most drums could not be visually identified.

Based on this inspection, SC DHEC returned on May 19, 1983 to collect samples of drum contents and soils for analysis. Results of analyses reported a number of volatile organic, including methylene chloride, trichloroethylene and trans-1,2-dichloroethylene, and base neutral extractable compounds. No acid extractable compounds were detected among the analyses performed.



PACOLET MILLS QUAD.

RMT ^{MC} 938.04
0292

FIGURE 2-1
SITE LOCATION MAP
SCALE: 1"=2000'

MEDLEY FARMS
GAFFNEY, SC.

SC DHEC informed EPA of the sampling results and EPA visited the site during the week of May 30, 1983. Samples were collected for analysis. Among the contaminants found were: methylene chloride, vinyl chloride, tetrachloroethylene, phenol, toluene, trichloroethylene and 1,2-dichloroethane. One on-site composite soil sample contained polychlorinated biphenyls (PCBs) at low levels.

An emergency removal action was initiated on June 20, 1983 by O.H. Materials Company pursuant to Section 104 and other provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). A total of 5,383 55-gallon drums and 15-gallon containers were removed from the site.

The liquids were bulked (totalling approximately 24,200 gallons) and taken off-site by tanker and incinerated. The solid wastes and contaminated soils (totalling approximately 2100 cubic yards) were taken to an approved hazardous waste landfill. Three drums containing PCBs were overpacked and sent to an approved disposal facility. An estimated 70,000 gallons of water were drained from the six small lagoons and treated through a pressurized sand/gravel/activated carbon filtration system for the removal of organic compounds. The treated effluent was analyzed to ensure it met State discharge standards prior to release into Jones Creek. The lagoons were then backfilled with clean earth and graded to the natural topography. These interim removal actions were completed on July 21, 1983.

Analytical testing of the drum contents, as well as the water and sediment in the lagoons during the removal action, indicated the presences of organic compounds. These included: toluene, benzene, methylene chloride, tetrachloroethylene and vinyl chloride.

NUS conducted a geological and geophysical study of the Medley Farm site at the direction of EPA during August, 1983 to determine the potential for ground water contamination at the site. The study included a literature search and geophysical investigation. The results of the geophysical survey indicated that suspected subsurface contaminants may have migrated as much as several hundred feet to the southeast, but this is based only upon the screening procedure. The NUS report stated that the suspected contaminants were most likely confined to the soil layer above the impermeable bedrock.

SC DHEC revisited the site in April of 1984 to perform a preliminary site investigation and install a monitoring well. An attempt to construct well MD2 was aborted when auger refusal was encountered

as the borehole reached 54 feet without encountering saturated conditions. A second borehole was advanced at a lower elevation (MD2A) that encountered saturated conditions at 65 feet and a monitoring well was installed. Soil from both boreholes and ground water from the well were analyzed for volatile organic compounds, primary metals, acid and base-neutral extractables. Volatile organic analyses of soil taken at 10 feet in borehole MD2 showed 81.4 ug/kg of methylene chloride and 102 ug/kg of 1,2-dichloroethane. Ground water sampling results for volatile organics are given in Table 1-1.

The Medley property is no longer used as a farm. The site is in a remote location and should receive little traffic.

TABLE 2-1
GROUND WATER ANALYSES AT THE MEDLEY FARM SITE

VOLATILE ORGANIC ANALYSIS - WELL MD2A		
DATE OF COLLECTION		
	APRIL 13, 1985 (1)	JULY 18, 1984 (2)
1) methylene chloride	39.05 ug/l	9.22 ug/l
2) 1,1-dichloroethene	1.887 ug/l	1,645 ug/l
3) 1,1-dichloroethane	160.5 ug/l	43.7 ug/l
4) trans-1,2-dichloroethene	37.9 ug/l	28.0 ug/l
5) chloroform	8.0 ug/l	3.56 ug/l
6) 1,2-dichloroethane	22.05 ug/l	7.53 ug/l
7) 1,1,1-trichloroethane	3,362 ug/l	2,188 ug/l
8) carbon tetrachloride	3,804 ug/l	830 ug/l
9) trichloroethene	6.6 ug/l	3,143 ug/l
10) 1,1,2-trichloroethane	66.9 ug/l	15.3 ug/l
11) toluene	29.6 ug/l	*
12) tetrachloroethene	2.5 ug/l	*

* No value given in SC DHEC analytical results.

SOURCE: SC DHEC, 1984, As referenced in the Serrine Environmental RI/FS Work Plan
(August, 1988)

Section 3 PROJECT DESCRIPTION

This Health and Safety Plan was initially prepared for the Medley Farm Site Steering Committee during the Remedial Investigation which was conducted by Sirrine Environmental Consultants. It has since been updated to address the Remedial Design/Remedial Action (RD/RA) and RA Construction activities to be conducted. The RI field investigations were conducted in a series of phases. The remaining work consists of the remedial design portion of the project and the Remedial Action phase of the project. A description of the major elements of this remaining work is outlined below:

The field activities planned during the Remedial Design included:

- Implementation of quarterly ground water and stream monitoring
- Supplemental field investigations in support of design efforts that may include:
 - Soil sampling,
 - Sediment sampling,
 - Surface water sampling,
 - Treatability studies, and
 - Drilling activities.
- Development of design for Remedial Action.

The Remedial Action Phase will consist of two distinct types of activities based on the degree to which site workers are exposed to possible safety or health hazards. Remedial Action tasks in which potential worker exposures are reasonably foreseeable include:

- Earth moving,
- Trenching,
- Grading,
- Underground pipe laying,
- Drilling for vacuum wells and ground water extraction wells,

- Pouring concrete pads,
- Installing treatment systems, and
- Sampling.

Remedial Action tasks in which potential exposures to hazards are not reasonably expected include:

- Electrical wiring of control technology,
- Surface pipe installation,
- Start-up testing,
- Operations and maintenance, and
- Bushhogging of site.

Section 4 HAZARD ASSESSMENT

4.1 General Chemical Hazards

Table 4-1 presents chemicals of potential concern and Table 4-2 a variety of inhalation limits applicable to work place exposures for organic contaminants found at the Medley Farm Site. The principal potential hazard associated with drilling operations and other subsurface RA Construction activities at this site is exposure to organic liquids and vapors. The likelihood of over-exposure to any of these compounds at this site is slight. However, due to the toxicity, the possible carcinogenic affects, and the various routes of entry into the body, appropriate monitoring and personal protective equipment will be used to reduce the risks. The American Conference of Governmental Industrial Hygienist (ACGIH) Threshold Limit Values (TLVs) for the work environment are given for volatile organic chemicals. Two TLV standards are presented for each chemical. The Time Weighted Average (TWA) is the average chemical concentration in air, averaged over an 8-hour period, to which most workers can be exposed for an 8-hour day and 40-hour week for 50 years without any adverse health effects. The Short Term Exposure Limit (STEL) is a 15-minute time-weighted average exposure that should not be exceeded at any time during a work day even if the 8-hour time-weighted average is within the TLV. Also presented, when available, is the Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL), and the NIOSH and OSHA Standards Completion Program (SCP) Immediately Dangerous to Life or Health (IDLH) level. The PEL values are presented either as an 8-hour TWA or a ceiling (Ceil) limit. Other relevant health-based information that applies to this safety and health plan or to the employee's right-to-know is discussed under summary health reviews given below or in the attached Material Safety Data Sheets (MSDSs) contained in Appendix A for those chemicals that may present significant risks.

4.2 Chemical Listing

This section presents a description of specific chemicals and associated properties.

- **Methylene Chloride**
(CH₂Cl₂, Dichloromethane, Methylene Dichloride)

Methylene chloride is a solvent used mainly as a low temperature extractant of substances which are adversely affected by high temperature. It is also used as a paint remover and degreaser. Repeated contact with methylene chloride may cause dermatitis. The liquid and vapor are irritating to the eyes and upper respiratory tract at higher concentrations. If the liquid is held in contact with the

TABLE 4-1

CHEMICALS OF POTENTIAL CONCERN

Volatile Organic Compounds

1,1-Dichloroethene
1,1-Dichloroethane
1,1,1-Trichloroethane
1,1,2-Trichloroethane
1,1,2,2-Tetrachloroethane
1,2-Dichloroethane
1,2-Dichloroethene (total)
1,2-Dichloropropane
1-Butanone
Acetone
Benzene
Chloroform
Chloromethane
Ethylbenzene
Methylene Chloride
Styrene
Tetrachloroethene
Trichloroethene
Vinyl Chloride

Semi-Volatile Organic Compounds

1,2,4-Trichlorobenzene
Butylbenzylphthalate
Di-n-octylphthalate
bis(2-Ethylhexyl)phthalate

Pesticides/PCB

Toxaphene
PCB-1254

TABLE 4-2
INHALATION EXPOSURE LIMITS*

CONTAMINANT	TLV-TWA	TLV-STEL	PEL	IDLH
1,1-Dichloroethane	200	250	100	4,000
1,2-Dichloroethane	1	2	50 100 Ceiling 200 Peak	1,000 (Ca)
Methylene Chloride	50	---	500 1000 Ceiling 2000 5 min/ 2-hr Peak	5,000
1,1,1-Trichloroethane	350	450	350	1,000
Toluene	100	150	100	2,000
Trichloroethylene	50	200	50 200 Ceiling	1,000 (Ca)
1,1-Dichloroethene vinylidene chloride (acrylonitrile polymer)	5	20	2 10 Ceiling	4,000
trans-1,2-dichloroethene	200	200	200	4,000
1,1,2-Trichloroethane	10	---	10	500 (Ca)
Carbon Tetrachloride	5	2	2 25 Ceiling	300 (Ca)
Vinyl chloride	5		1 ppm 5 ppm Ceiling	(Ca)

* These limits are presented in units of parts per million (ppm) unless otherwise indicated.
 (Ca) Carcinogen

TABLE 4-2 (Continued)
INHALATION EXPOSURE LIMITS*

CONTAMINANT	TLV-TWA	TLV-STEL	PEL	IDLH
Tetrachloroethene	50	200	25 200 Ceiling	500 (Ca)
Chloroform	10	2	2 2/60 min Ceiling	1,000 (Ca)
Benzene	10	5	1 50 Ceiling	3,000 (Ca)
Phenol	5 (Skin)	----	5	250
Polychlorinated biphenyls	0.5 mg/m ³	0.5 mg/m ³	0.5 mg/m ³	5 mg/m ³ (Ca)
1,1,2,2 Tetrachlorethane	1	----	1	150 (Ca)
1,2 Dichloropropane	75	110	75	2,000 (Ca)
2-Butanone	200	300	200	3,000
Acetone	750	1,000	750	20,000
Chloromethane	50	100	50	10,000 (Ca)
Ethyl benzene	100	125	100	2,000
Styrene	50	100	50	5,000
1,2,4-Trichlorobenzene	5	----	5 Ceiling	----
Butylbenzyl phthalate	N/A	N/A	N/A	Unknown
Di-n-butylphthalate	5 mg/m ³	----	5 mg/m ³	Unknown (Ca)
Di-n-octylphthalate	N/A	N/A	N/A	Unknown
bis(2-ethylhexyl)phthalate	5 mg/m ³	10 mg/m ³	5 mg/m ³	Unknown (Ca)
Toxaphene	0.5 mg/m ³	1.0	0.5 mg/M ³	200 mg/m ³ (Ca)

* These limits are presented in units of parts per million (ppm) unless otherwise indicated.
(Ca) Carcinogen

skin, it may cause skin burns. Methylene chloride is a mild narcotic. Effects from intoxication include headache, giddiness, stupor, irritability, numbness, and tingling in the limbs. Irritation to the eyes and upper respiratory passages occurs at higher dosages. In severe cases, observers have noted toxic encephalopathy with hallucinations, pulmonary edema, coma, and death. Cardiac arrhythmias have been produced in animals but have not been common in human experiences. Exposure to this agent may cause elevated carboxyhemoglobin levels which may be significant in smokers, or workers with anemia or heart disease, and those exposed to carbon monoxide. The ACGIH has listed methylene chloride as a suspected human carcinogen.

TLV: (proposed change)	50 ppm TWA (suspected human carcinogen)
PEL:	500 ppm TWA, 1000 ppm Ceil, 2000 ppm 5-min/2-hr peak
IDLH:	5000 PPM
DESCRIPTION:	Colorless liquid with a chloroform-like odor
SOLUBILITY:	1.3%
FLASH POINT:	None
IONIZATION POTENTIAL:	11.35 eV
VAPOR PRESSURE:	350 mm Hg @ 20C
LEL:	N/A
UEL:	N/A
RESPIRATOR CARTRIDGE:	
BREAKTHROUGH TIME:	10 minutes at 1000 ppm (cartridge respirators are not recommended for this material due to its poor warning properties)
HNu SENSITIVITY:	94% with an 11.7 eV lamp
OVA SENSITIVITY:	90%

• **1,1-Dichloroethylene**
(1,1-Dichloroethene, 1,1-DCE, Vinylidene Chloride)

1,1-Dichloroethene, is a colorless volatile liquid with an ether-like, slightly acrid odor, similar to chloroform. The major routes of exposure are through inhalation and ingestion. 1,1-DCE is an experimental carcinogen and mutagen by skin contact, inhalation and other routes. It has toxicological properties similar to vinyl chloride. 1,1-Dichloroethylene is a severe irritant to skin, eyes and lungs, and can cause skin burns by rapid evaporation and consequent freezing. In high concentrations it acts as an anesthetic. Chronic exposure has shown liver injury. Circulatory and bone changes in the fingers have been reported in workers handling the material. It is an extreme fire hazard, and when heated to decomposition emits highly toxic fumes.

TLV:	5 ppm TWA, 20 ppm STEL
PEL:	N/A
IDLH:	N/A
DESCRIPTION:	Colorless liquid with a chloroform-like odor
SOLUBILITY:	N/A
FLASH POINT:	0°F
IONIZATION POTENTIAL:	N/A

VAPOR PRESSURE: N/A
LEL: 7.3%
UEL: 16.0%
RESPIRATOR CARTRIDGE:
BREAKTHROUGH TIME: N/A
HNU SENSITIVITY: N/A
OVA SENSITIVITY: 40%

- **1,1-Dichloroethane**
(CH_3CHCl_2 , *Ethylidene dichloride, Ethylidene chloride, Asymmetrical Dichloroethane*)

1,1-Dichloroethane is a colorless liquid with an aromatic, ethereal odor and a hot saccharine taste. It is a solvent and is used in the plastics industry.

Ethylidene dichloride is an experimental teratogen and tumorigen, and shows moderate toxicity by ingestion. Liver damage has been reported in experimental animals. It is expected to affect the central nervous system, with symptoms of nausea, dizziness, headache and light-headedness. It is an extreme fire hazard, and emits toxic fumes upon thermal decomposition.

TLV: 200 ppm TWA, 250 ppm STEL
PEL: 100 ppm
IDLH: 4000 ppm
DESCRIPTION: Colorless liquid with a chloroform-like odor
SOLUBILITY: 0.35 to 0.63%
FLASH POINT: 36 to 39°F
IONIZATION POTENTIAL: N/A
VAPOR PRESSURE: 180 to 265 mm Hg @ 20C
LEL: 9.7%
UEL: 12.8%
RESPIRATOR CARTRIDGE:
BREAKTHROUGH TIME: 23 minutes at 1000 ppm
HNU SENSITIVITY: 129% with an 11.7 eV lamp (1,2-dichloroethane)
OVA SENSITIVITY: 80%

- **Chloroform**
(CHCl_3 , *Trichloromethane, Methenyl chloride*)

Chloroform is a clear, colorless liquid with a characteristic odor. It was one of the earliest general anesthetics, but its use for this purpose has been abandoned because of toxic effects. Chloroform is widely used as a solvent, especially in the lacquer industry. It is also used in the extraction and purification of penicillin and other pharmaceutical, in the manufacture of artificial silk, plastics, floor polishes, and fluorocarbons, and also as a solvent in the semiconductor industry.

Chloroform may produce burns if left in contact with the skin. It is a relatively potent anesthetic at high concentrations. Death from its use as an anesthetic has resulted from liver damage and from cardiac arrest. Exposure may cause lassitude, digestive disturbance, dizziness, mental dullness and coma. Chronic overexposure has been

shown to cause enlargement of the liver, and kidney damage. Alcoholics seem to be affected sooner and more severely from chloroform exposure. Disturbance to the liver is more characteristic of exposure than central nervous system depression or renal injury. There is some animal experimental evidence that suggests chloroform may be a carcinogen. The ACGIH has listed chloroform on its A2 carcinogen list, as a suspected human carcinogen.

TLV: 10 ppm TWA, A2 carcinogen
PEL: 50 ppm
IDLH: 1000 ppm
DESCRIPTION: Colorless liquid with a pleasant, sweet odor
SOLUBILITY: 0.8%
FLASH POINT: None
IONIZATION POTENTIAL: 11.42 eV
VAPOR PRESSURE: 160 mm Hg @ 20C
LEL: N/A
UEL: N/A
RESPIRATOR CARTRIDGE:
BREAKTHROUGH TIME: 33 minutes at 1000 ppm
HNu SENSITIVITY: 60% with an 11.7 eV lamp
OVA SENSITIVITY: 65%

- **1,2-Dichloroethane**
(C1CH₂CH₂C1, Ethylene Dichloride, Sym-dichloroethane, Ethylene Chloride, Glycol Dichloride, Beta-dichloroethane)

1,2-Dichloroethane is a colorless, flammable liquid which has a pleasant odor and a sweetish taste. It is used widely in the manufacture of ethyl glycol, PVD, nylon, and other plastics. It is a solvent for resins, asphalt, bitumen, rubber and paint, and is used as a degreaser in the engineering, textile and petroleum industries. It is also used as an extracting agent for soy bean oil and caffeine, an antiknock agent in gasoline, a pickling agent, a fumigant, and a drycleaning agent.

Repeated contact with the liquid can produce dermatitis. The liquid and vapor can also cause eye damage. Inhalation of high concentrations may cause nausea, vomiting, mental confusion, dizziness, and pulmonary edema. Chronic exposure has been associated with liver and kidney damage.

TLV: 10 ppm TWA, A2 carcinogen
PEL: 50 ppm, 100 ppm Ceil, 200 ppm Peak
IDLH: 1000 ppm
DESCRIPTION: Clear liquid with a sweet odor like chloroform
SOLUBILITY: 0.8%
FLASH POINT: 55°F
IONIZATION POTENTIAL: 9.64 eV
VAPOR PRESSURE: 62 mm @ 20C
LEL: 6.2%
UEL: 16%
RESPIRATOR CARTRIDGE:

BREAKTHROUGH TIME: 54 minutes at 1000 ppm
HNU SENSITIVITY: 129% with an 11.7 eV lamp
OVA SENSITIVITY: 80%

- **Methyl Chloroform**
(CH₃CCl₃, 1,1,1-Trichloroethane)

Methyl chloroform, commonly known as 1,1,1-Trichloroethane, is a common solvent, used as a degreaser and cleaner for metals. Liquid and vapor are irritating to eyes on contact. This effect usually noted first in acute exposure cases. Mild conjunctivitis may develop but recovery is usually rapid. Repeated skin contact may produce dermatitis, due to the solvent's defatting properties. Methyl chloroform is a narcotic and depresses the central nervous system. Acute exposure symptoms include dizziness, uncoordination, drowsiness, increased reaction time, unconsciousness, and death.

TLV: 350 ppm TWA, 450 ppm STEL
PEL: 350 ppm
IDLH: 1000 ppm
DESCRIPTION: Colorless liquid with a mild, chloroform-like odor
SOLUBILITY: 0.07%
FLASH POINT: NONE
IONIZATION POTENTIAL: N/A
VAPOR PRESSURE: 100 mm Hg @ 20C
LEL: 7%
UEL: 16%
RESPIRATOR CARTRIDGE:
BREAKTHROUGH TIME: 40 minutes at 1000 ppm
HNU SENSITIVITY: 90% with an 11.7 eV lamp
OVA SENSITIVITY: 105%

- **Carbon Tetrachloride**
(Tetrachloroethane, Perchloromethane)

Carbon tetrachloride is a colorless, nonflammable liquid with a characteristic odor. It can be used as a solvent for oils, fats, lacquers, varnishes, rubber, waxes and resins. Fluorocarbons are chemically synthesized from it. It is also used as an azeotropic drying agent for spark plugs and as a fumigant. Its use in applications other than in the chemical industry is negligible, due to its carcinogenic status. It is listed as a suspected human carcinogen by the ACGIH.

Carbon tetrachloride removes the natural lipid cover of the skin. Repeated contact may lead to a dry, scaly, fissured dermatitis. Eye contact is slightly irritating, but this condition is transient. Excessive exposure may result in central nervous system depression, and gastrointestinal symptoms may also occur. Following acute exposure, signs and symptoms of liver and kidney damage may develop, such as nausea, vomiting, abdominal pain, diarrhea, enlarged and tender liver, and jaundice resulting from toxic hepatitis. Diminished urinary volume, red and white blood cells in the urine, albuminuria, coma, and death may be consequences of acute renal failure.

The hazard of systemic effects is increased when carbon tetrachloride is used in conjunction with ingested alcohol.

TLV: 5 ppm TWA, Skin, A2 carcinogen
PEL: 10 ppm, 25 ppm Ceil, 200 ppm 5-min/4-hr Peak
IDLH: 300 ppm
DESCRIPTION: Colorless liquid with an ether-like odor
SOLUBILITY: 0.08%
FLASH POINT: NONE
IONIZATION POTENTIAL: 11.47 eV
VAPOR PRESSURE: 91 mm Hg @ 20C
LEL: N/A
UEL: N/A
RESPIRATOR CARTRIDGE:
BREAKTHROUGH TIME: 77 minutes at 1000 ppm
HNu SENSITIVITY: 90% with an 11.7 eV lamp
OVA SENSITIVITY: 10%

• **Trichloroethylene**

(CHC1CC1₂, Ethylene Trichloride, Ethinyl Trichloride, Trichloroethene, TCE)

Trichloroethylene is a colorless, nonflammable, non-corrosive liquid with the "sweet" odor characteristic of some chlorinated hydrocarbons. Decomposition of trichloroethylene, due to contact with hot metal or ultraviolet radiation, forms products including chlorine gas, hydrogen chloride, and phosgene. Dichloroacetylene may be formed from the reaction of alkali with trichloroethylene. TCE is primarily used as a solvent in vapor degreasing. It is also used for extracting caffeine from coffee, as a drycleaning agent, and as a chemical intermediate in the production of pesticides, waxes, gums, resins, tars, paints, varnishes, and specific chemicals such as chloracetic acid.

Exposure to trichloroethylene vapor may cause irritation of the eyes, nose, and throat. The liquid, if splashed in the eyes, may cause burning irritation and damage. Repeated or prolonged skin contact with the liquid may cause dermatitis. Acute exposure to trichloroethylene depresses the central nervous system exhibiting such symptoms as headache, dizziness, vertigo, tremors, nausea and vomiting, irregular hear beat, sleepiness, fatigue, blurred vision, and intoxication similar to that of alcohol. Unconsciousness and death have been reported. Alcohol may make the symptoms of trichloroethylene overexposure worse. If alcohol has been consumed, the overexposed worker may become flushed. TCE addiction and peripheral neuropathy have been reported. Recent reports indicate that exposure to trichloroethylene may induce liver tumors in mice.

TLV: 50 ppm TWA, 200 ppm STEL
PEL: 100 ppm, 200 ppm Ceil, 300 ppm Peak
IDLH: 1000 ppm
DESCRIPTION: Colorless liquid with a chloroform-like odor
SOLUBILITY: 0.1%
FLASH POINT: NONE

IONIZATION POTENTIAL:	9.47 eV
VAPOR PRESSURE:	58 mm Hg @ 20C
LEL:	11%
UEL:	41%
RESPIRATOR CARTRIDGE:	
BREAKTHROUGH TIME:	55 minutes at 1000 ppm
HNu SENSITIVITY:	89% with an 10.2 eV lamp
OVA SENSITIVITY:	70%

• **Toluene**

(C₆H₅CH₃, Toluol, methylbenzene, phenylmethane, methylbenzol)

Toluene is a clear, colorless, noncorrosive liquid with a sweet, pungent, benzene-like odor. It may encountered in the manufacture of benzene, and it is also used as a chemical feed stock for toluene diisocyanate, phenol, benzyl and benzyl derivatives, benzoic acid, toluene sulfonates, nitrotoluenes, vinyl toluene, and saccharin, and as a solvent for paints and coatings, or as a component of automobile and aviation fuels.

Toluene may cause irritation of the eyes, respiratory tract, and skin. Repeated or prolonged contact with the liquid may cause removal of natural lipids from the skin, resulting in dry, fissured dermatitis. The liquid splashed in the eyes may cause irritation and reversible damage. Acute exposure to toluene predominantly results in central nervous system depression. Symptoms and signs include headache, dizziness, fatigue, muscular weakness, drowsiness, incoordination with staggering gait, skin paresthesia, collapse, and coma.

TLV:	100 ppm TWA, 150 ppm STEL
PEL:	200 ppm, 300 ppm Ceil, 500 ppm 10-min Peak
IDLH:	2000 ppm
DESCRIPTION:	Colorless liquid with an aromatic odor like benzene
SOLUBILITY:	0.05%
FLASH POINT:	40°F
IONIZATION POTENTIAL:	8.82 eV
VAPOR PRESSURE:	22 mm Hg @ 20C
LEL:	1.3%
UEL:	7.1%
RESPIRATOR CARTRIDGE:	
BREAKTHROUGH TIME:	94 minutes at 1000 ppm
HNu SENSITIVITY:	100% with an 10.2 eV lamp
OVA SENSITIVITY:	110%

• **Perchloroethylene**

(CCl₂CCl₂, Tetrachloroethylene, Carbon Dichloride, Ethylene Tetrachloride)

Perchloroethylene is a widely used solvent with particular use as a drycleaning agent and a degreaser. Repeated contact with the liquid may cause dermatitis. High concentrations may produce eye and nose irritation. Acute exposure to tetrachloroethylene may cause central nervous system depression, hepatic injury, and anesthetic death. Cardiac arrhythmias and renal injury have been produced in animal

experiments. Signs and symptoms of overexposure include malaise, dizziness, headache, increased perspiration, fatigue, staggering gait, and slowing of mental ability. These usually subside quickly upon removal into the open air.

TLV:	50 ppm TWA, 200 ppm STEL
PEL:	100 ppm, 200 ppm Ceil, 300 ppm 5-min/3-hr Peak
IDLH:	500 ppm
DESCRIPTION:	Colorless liquid with an odor like ether or chloroform
SOLUBILITY:	0.015%
FLASH POINT:	N/A
IONIZATION POTENTIAL:	9.32 eV
VAPOR PRESSURE:	14 mm Hg
LEL:	N/A
UEL:	N/A
RESPIRATOR CARTRIDGE:	
BREAKTHROUGH TIME:	107 minutes at 1000 ppm
HNu SENSITIVITY:	N/A
OVA SENSITIVITY:	70%

• **Phenol**
(C₆H₅OH)

Phenol is commonly used in the semi-conductor industry as a component in the formation of plastics and resins. Phenol has a marked corrosive effect on any tissue. When it comes in contact with the eyes it may cause severe damage and blindness. On contact with the skin, it does not cause pain but causes a whitening of the exposed area. If the chemical is not removed promptly, it may cause a severe burn or systemic poisoning. Systemic effects may occur from any route of exposure. These include paleness, weakness, sweating, headache, ringing of the ears, shock, cyanosis, excitement, frothing of the nose and mouth, dark colored urine, and death. If death does not occur, kidney damage may appear. Repeated or prolonged exposure to phenol may cause chronic phenol poisoning. This condition is very rarely reported. The symptoms of chronic poisoning include vomiting, difficulty in swallowing, diarrhea, lack of appetite, headache, fainting, dizziness, dark urine, mental disturbances, and possibly, skin rash. Liver and kidney damage and discoloration of the skin may occur.

TLV:	5 ppm TWA Skin
PEL:	5 ppm
IDLH:	100 ppm
DESCRIPTION:	Colorless to pink solid or thick liquid with a characteristic sweet, tarry odor
SOLUBILITY:	8.4%
FLASH POINT:	174°F
IONIZATION POTENTIAL:	8.5 eV
VAPOR PRESSURE:	0.36 mm Hg @ 20C
LEL:	1.7%
UEL:	8.6%
RESPIRATOR CARTRIDGE:	
BREAKTHROUGH TIME:	N/A

HNu SENSITIVITY: 77% with a 9.5 eV lamp
OVA SENSITIVITY: N/A

- **1,2-Dichloroethylene**
($C_2H_2Cl_2$, *Acetylene dichloride, sym-dichloroethylene, 1,2-dichloroethene*)

1,2-Dichloroethylene, exists in two isomers, cis 60% and trans 40%. There are variations in toxicity between these two forms. At room temperature, it is a liquid with a slight acrid, ethereal odor. Gradual decomposition results in hydrochloric acid formation in the presence of ultraviolet light or upon contact with hot metal. 1,2-Dichloroethylene is used as a solvent for waxes, resins, and acetyl cellulose. It is also used in the extraction of rubber, as a refrigerant, in the manufacture of pharmaceuticals and artificial pearls, and in the extraction of oils and fats from fish and meat.

1,2-Dichloroethylene acts principally as a narcotic, causing central nervous system depression. Symptoms of acute exposure include dizziness, nausea and frequent vomiting, and central nervous system intoxication similar to that caused by alcohol. Renal effects, when they do occur, are transient.

TLV: 200 ppm
PEL: 200 ppm
IDLH: 4000 ppm
DESCRIPTION: Colorless liquid with an ether-like, slightly acrid odor, like chloroform
SOLUBILITY: 0.35 to 0.63%
FLASH POINT: 36 to 37°F
IONIZATION POTENTIAL: 9.66 eV
VAPOR PRESSURE: 180 to 265 mm Hg @ 20°C
LEL: 9.7%
UEL: 12.8%
RESPIRATOR CARTRIDGE:
BREAKTHROUGH TIME: 33 minutes at 1000 ppm
HNu SENSITIVITY: N/A
OVA SENSITIVITY: 50%

- **Vinyl Chloride**
($CH_2=CHCl$, *Chloroethylene, chloroethene, monochloroethylene*)

Vinyl chloride, is a flammable gas at room temperature and is usually encountered as a cooled liquid. The colorless liquid forms a vapor which has a pleasant ethereal odor. Vinyl chloride is used as a vinyl monomer in the manufacture of polyvinyl chloride and other resins. It is also used as a chemical intermediate and as a solvent.

Vinyl chloride is a skin irritant, and contact with the liquid may cause frostbite upon evaporation. The eyes may be immediately and severely irritated. Vinyl chloride depresses the central nervous system causing symptoms which resemble mild alcohol intoxication. Light headedness, some nausea, and dulling of visual and auditory responses may develop in acute exposures. Death from severe vinyl chloride

exposure has been reported. Chronic exposure also may cause hepatic damage. Vinyl chloride is regarded as a human carcinogen, and a causal agent of angiosarcoma of the liver. Excess cancer of the lung and the lymphatic and nervous systems also has been reported. Experimental evidence of tumor induction in a variety of organs, including liver, lung, brain, and kidney, as well as nonmalignant alterations, such as fibrosis and connective tissue deterioration, indicate the multisystem oncogenic and toxicologic of vinyl chloride.

TLV:	5 ppm
PEL:	1 ppm
IDLH:	
DESCRIPTION:	Colorless gas, liquifies in a freezing mixture
SOLUBILITY:	Slight
FLASH POINT:	-108°F
IONIZATION POTENTIAL:	9.995 eV
VAPOR PRESSURE:	2580 mm Hg @ 20°C
LEL:	3.6%
UEL:	33%
RESPIRATOR CARTRIDGE:	
BREAKTHROUGH TIME:	3.8 minutes at 1000 ppm
HNu SENSITIVITY:	50% with a 10.2 eV lamp
OVA SENSITIVITY:	35%

• ***Chlorodiphenyls and Derivatives***
(C₁₂H_{10-x}Cl_x, Chlorobiphenyls, polychlorinated diphenyl, PCB)

Chlorodiphenyls, are diphenyl rings in which one or more hydrogen atoms are replaced by a chlorine atom. Most widely used are chlorodiphenyl (42% chlorine), containing 3 chlorine atoms in unassigned positions, and chlorodiphenyl (54% chlorine) containing 5 chlorine atoms in unassigned positions. These compounds are light, straw-colored liquids with typical chlorinated aromatic odors; 42% chlorodiphenyl is a mobile liquid and 54% chlorodiphenyl is a viscous liquid. Chlorinated diphenyl oxides are ethers of chlorodiphenyls and are included in this group. They range from clear, oily liquids to white to yellowish waxy solids, depending on the degree of chlorination. Chlorinated diphenyls are used alone and in combination with chlorinated naphthalenes. They are stable, thermoplastic, and non-flammable, and find chief use in insulation for electric cables and wires in the production of electric condensers, as additives for extreme pressure lubricants, and as a coating in foundry use.

Prolonged skin contact with PCB fumes or cold wax may cause the formation of chloracne. Irritation to eyes, nose, and throat also may occur. The above standards are considered low enough to prevent systemic effects, but it is not known whether or not those levels will prevent local effects. Generally, toxic effects are dependent upon the degree of chlorination; the higher the degree of substitution, the stronger the effects. Acute and chronic exposure can cause liver damage. Signs and symptoms include edema, jaundice, vomiting, anorexia, nausea, abdominal pains, and fatigue. Studies of accidental oral intake indicate that chlorinated diphenyls are embryotoxic, causing stillbirth, a characteristic grey-brown skin, and increased eye discharge in

infants born to women exposed during pregnancy. PCBs are characterized as probable human carcinogens.

TLV: 0.5 mg/m³
PEL: 0.5 mg/m³
IDLH: 5 mg/m³
DESCRIPTION: Varies according to % of chlorine
SOLUBILITY: Insoluble
FLASH POINT: 349° to 432°F
VAPOR PRESSURE: .00006 - .001 mg Hg @ 20°C
RESPIRATOR CARTRIDGE:
BREAKTHROUGH TIME: N/A
HNU SENSITIVITY: N/A
OVA SENSITIVITY: N/A

- **1,1,2-Trichloroethane**
(CH₂ClCHCl₂, Vinyl trichloride)

1,1,2-trichloroethane, is a colorless, nonflammable liquid. It is an isomer of 1,1,1-trichloroethane but should not be confused with it toxicologically. 1,1,2-Trichloroethane is comparable to carbon tetrachloride and tetrachloroethane in toxicity. 1,1,2-Trichloroethane is used as a chemical intermediate and as a solvent, but is not as widely used as its isomer, 1,1,1-trichloroethane.

Little is known of the toxicity of 1,1,2-trichloroethane to humans. Animal experiments show 1,1,2-trichloroethane to be a potent central nervous system depressant. The injection of anesthetic doses in animals was associated with both liver and renal neurosis. It is characterized as a possible human carcinogen based upon limited evidence in animal studies.

TLV: 10 ppm SKIN
PEL: 10 ppm
IDLH: 500 ppm
DESCRIPTION: Colorless liquid with a sweet odor like chloroform
SOLUBILITY: 0.5%
FLASH POINT: None
VAPOR PRESSURE: 19 mm Hg @ 20°C
LEL: 6%
UEL: 15.5%
RESPIRATOR CARTRIDGE:
BREAKTHROUGH TIME: 72 minutes at 1000 ppm

- **Benzene**
(C₆H₆, Benzol, phenyl hydride, coal naphtha, phene, benxole, cyclohexatriene)

Benzene, is a clear, volatile, colorless, highly flammable liquid with a characteristic odor. The most common commercial grade contains 50-100% benzene, the remainder consisting of toluene, xylene, and other constituents which distill below 120°C. Benzene is used as a constituent in motor fuels, as a solvent for fats, inks, oils, paints,

plastics, and rubber, in the extraction of oils from seeds and nuts, and in photogravure printing. It is also used as a chemical intermediate. By alkylation, chlorination, nitration, and sulfonation, chemicals such as styrene, phenols, and maleic anhydride are produced. Benzene is also used in the manufacture of detergents, explosives, pharmaceuticals, and dyestuffs.

Exposure to liquid and vapor may produce primary irritation to skin, eyes, and upper respiratory tract. If the liquid is aspirated into the lung, it may cause pulmonary edema and hemorrhage. Erythema, vesiculation, and dry, scaly dermatitis also may develop from defatting of the skin. Acute exposure to benzene results in central nervous system depression, headache, dizziness, nausea, convulsions, coma, and death may result. Death has occurred from large acute exposure as a result of ventricular fibrillation, probably caused by myocardial sensitization to endogenous epinephrine. Early reported autopsies revealed hemorrhages (non-pathognomonic) in the brain, pericardium, urinary tract, mucous membranes, and skin. Chronic exposure to benzene is well documented to cause blood changes. Benzene is basically a myelotoxic agent. Erythrocyte, leukocyte, and thrombocyte counts may first increase, and then aplastic anemia may develop with anemia, leukopenia, and thrombocytopenia. The bone marrow may become hypo- or hyper-active and may not always correlate with peripheral blood. Recent epidemiologic studies along with case reports of benzene related blood dyscrasias and chromosomal aberrations have led NIOSH to conclude that benzene is leukemogenic. The US EPA also characterizes benzene as a human carcinogen. The evidence is most convincing for acute myelogenous leukemia and for acute erythroleukemia, but a connection with chronic leukemia has been noted by a few investigators. Recent work has shown increases in the rate of chromosomal aberrations associated with benzene myelotoxicity. These changes in the bone marrow are stable or unstable and may occur several years after exposure has ceased. "Stable" changes may give rise to leukemic clones and seem to involve chromosomes of the G group.

TLV:	10 ppm
PEL:	10 ppm
IDLH:	2,000 ppm
DESCRIPTION:	Colorless liquid with an aromatic odor
SOLUBILITY:	0.18%
FLASH POINT:	12°F
IONIZATION POTENTIAL:	9.25 eV
VAPOR PRESSURE:	75 mm Hg @ 20°C
LEL:	1.3%
UEL:	7.1%
RESPIRATOR CARTRIDGE:	
BREAKTHROUGH TIME:	73.3 minutes at 1000 ppm
HNu SENSITIVITY:	100% with an 10.2 eV lamp
OVA SENSITIVITY:	150%

4.3 Physical Hazards

4.3.1 Utilities

Overhead or underground utilities such as electric, gas, telephone, water, sewer, and drainage in the project work areas must be located before the start of operations that require set-up of heavy equipment such as drill rigs, bulldozers, and backhoes. Due to the remote, rural location of the site, hazards from these utilities should be minimal. However, confirmation should be made prior to work commencing at the site. Information regarding the location of utilities will be kept at the field site for reference. Efforts will be made to use a utility location service prior to subsurface work if needed.

4.3.2 Heavy Equipment

Heavy equipment, such as drill rigs used on-site, will remain under the control of the contractor, who is responsible for maintaining the equipment in good working order and operating it safely. Heavy equipment must have audible back-up alarms in working condition, provide rollover protection, and be equipped with seat belts and fire extinguishers. Spark arresters will be installed in all equipment used in potentially flammable and explosive atmospheres. Personnel will not work near equipment that they judge to be unsafe because of deterioration, missing parts, obvious defects, or improper operation. Equipment will be inspected daily prior to operation by the Site Contractor.

Operation of heavy equipment in areas with steep embankments or unstable ground will be avoided. If it is necessary to operate equipment in these areas, the contractor will make provisions to ensure the safety of the equipment operator and other personnel in the area.

4.3.3 Noise

Hearing protection must be worn by personnel when they are exposed to noise levels of 85 decibels A scale (dBA) or greater. Noise measurements, if conducted, should be performed with sound level meters in slow response mode, or with noise dosimeters having a beginning collection point established at 80 dBA. Heavy equipment, including drill rigs, when in operation, generally produce noise levels that exceed 85 dBA for personnel working at or near the equipment.

4.3.4 Biological Hazards

Many of the areas of the Medley Farm Site are overgrown with dense underbrush. To access some of the existing monitoring wells and other remote areas of the site, these areas must be entered. There are several potential hazards that may be encountered. They include the following:

- **Snakes** - Poisonous snakes may be present on this site. Site personnel entering overgrown areas will wear snake chaps or gaiters.
- **Ticks** - It is anticipated that ticks will be a problem at this site. Tick repellent or other appropriate insect repellent will be used. Long sleeves are recommended.
- **Other Insects** - Stinging insects such as bees, wasps, or yellow jackets are expected to be on-site. Personnel who may have allergic reactions if stung, will keep a bee sting kit on-site.
- **Poisonous Plants** - Poison ivy and poison oak may be present at the site. Personnel should avoid contact.

Section 5

QUALITATIVE RISK ANALYSIS

The principal potential chemical hazard associated with drilling operations and other subsurface RA Construction activities at this site is exposure to organic liquids and vapors. The likelihood of over-exposure to these compounds at this site is slight. However, due to the toxicity, the possible carcinogenic affects, and the various routes of entry into the body, appropriate monitoring and personal protective equipment will be used to reduce the risks.

Heavy metals have also been detected at this site, and reasonable steps will be taken to prevent inhalation and ingestion of contaminated soil particles. If substantial airborne dust becomes evident, the use of full-face respirators with combination cartridges may be required. These requirements will be identified under Section 7, Required Personal Protective Equipment.

Section 6

ENVIRONMENTAL MONITORING

Organic vapor readings will be made using either a Foxboro OVA (Model 128), an HNu Photoionization Analyzer, (Model PF 101), or a Photovac Microtip during well sampling at the time the well is opened. If a newly opened well has an excessively high reading (as defined in Table 7-1), the sampling personnel shall leave the site for 10 minutes and then return for a definitive reading. This second reading and subsequent readings will be used to trigger the use of additional personal protective equipment (PPE), if warranted. An additional reading will be taken during each well sampling at the time the first water sample is removed. During boring operations for soil samples, organic vapor readings will be taken when the soil cuttings are first brought to the surface, when the augers are disconnected from the drive cap and when the split spoon sampler is opened to remove the sample. If vapor concentrations in the breathing zone exceed the action levels established in this plan, appropriate respirators will be donned.

During well installation activities, organic vapor readings will be made during all core barrel removal, drill pipe disconnection, and all initial sample inspection, pumping and/or bailing operations at each new depth. All organic vapor readings will be recorded in the field log by the HSR (and copies delivered to the Health and Safety Coordinator).

For subsurface/intrusive work associated with the RD/RA and RA Construction phases, monitoring will be conducted continuously during these activities and documented in the field log. These activities include, but are not limited to earth moving, trenching, grading, and underground pipe laying.

Section 7

REQUIRED PERSONAL PROTECTIVE EQUIPMENT (PPE)

RESPIRATORY PROTECTION

Due to previous sample results observed at this site, level C or a modified level D (Tyvek® suits, boots, gloves) must be maintained throughout the duration of the work in the exclusion zone. Respiratory protection requirements will be in accordance with Table 7-1.

NONRESPIRATORY PERSONAL PROTECTIVE EQUIPMENT

The following items will be provided and available during field operations at this site: (PPE requirements for each task are provided below)

- Hardhat
- Neoprene, Nitrile, or PVC steel toe boots, or leather steel toe boots with appropriate boot covers
- Disposal latex or PVC gloves
- Tyvek® suits
- Safety glasses or goggles for work around drill equipment or splash hazards
- Hearing protection
- Eyewash (15 minute unit located at designated decontamination area)
- Fire extinguisher (20 lb. ABC)
- First aid kit
- Decontamination sprayer and decon solution (to be located at designated decontamination area)
- 5-gallon cooler with drinking water or Gatorade
- 5-gallon wash water container (for washing hands and face)

Table 7-2 presents a summary of personal protective equipment.

TABLE 7-1

RESPIRATORY PROTECTION REQUIREMENTS

STAGE	ORGANIC VAPOR CONCENTRATION	RESPONSE		
			If the detector tube reading for vinyl chloride is ≥ 2 ppm and/or the detector tube reading for carbon tetrachloride is ≥ 5 ppm, a full face respirator is required.	
1	2 ppm continuous 4 ppm for a 15-minute period (above background)	Put on a full face respirator with HEPA/ Organic vapor combination cartridges	<u>OR</u> Take a grab sample using Sensidyne or MSA detector tubes for Vinyl Chloride and Carbon Tetrachloride	
			If the detector tube reading for vinyl chloride is < 2 ppm and the detector tube reading for carbon tetrachloride is < 5 ppm, proceed to stage 2, 3 or 4.	
2	6.5 ppm continuous 50 ppm for a 10-minute period (above background)	Put on a full face respirator with HEPA/ Organic vapor combination cartridges		
3	65 ppm (above background)	Put on a full face respirator with HEPA/ Organic vapor combination cartridges.		
4	100 ppm (above background)	Evacuate site and notify Health and Safety Coordinator and Project Manager for further instructions		

TABLE 7-2
PERSONAL PROTECTIVE EQUIPMENT SUMMARY

OPERATION	PPE REQUIRED IN THE EXCLUSION ZONE
Soil Gas Survey	Work boots, nitrile or neoprene gloves
Test Pit Excavation	Neoprene, nitrile or heavy duty PVC steel toe boots, Tyvek [®] suits, nitrile or neoprene gloves, hard hat, safety glasses, full respirator with organic vapor cartridges if monitoring indicates a need, (combination cartridges are acceptable), hearing protection (when heavy equipment operating).
Well Installation	Neoprene, nitrile or heavy duty PVC steel toe boots, Tyvek [®] suits, nitrile or neoprene gloves, hard hat, safety glasses, full respirator with organic vapor cartridges if monitoring indicates a need, (combination cartridges are acceptable), hearing protection (when heavy equipment operating).
Ground Water Sampling	Neoprene, nitrile or heavy duty PVC boots, Tyvek [®] suits, nitrile or neoprene gloves, safety glasses
Slug Tests	Neoprene, nitrile or heavy duty PVC boots, nitrile or neoprene gloves, Tyvek [®] suits.
Soil Borings	Neoprene, nitrile or heavy duty PVC boots, nitrile or neoprene gloves, Tyvek [®] suits, nitrile or neoprene gloves, safety glasses. Respirators may be needed if organic vapors are detected above action level.
Surface Water and Sediment Sampling	Neoprene, nitrile or heavy duty PVC boots, nitrile or neoprene gloves, Tyvek [®] suits, nitrile or neoprene gloves, safety glasses.
Pump Test	Neoprene, nitrile or heavy duty PVC steel toe boots, Tyvek [®] suits, nitrile or neoprene gloves, respirators if necessary, safety glasses as determined by monitoring
Intrusive Construction Activities (trenching, grading, pipe laying, earth removing, concrete pouring)	Neoprene, nitrile or heavy duty PVC steel toe boots, Tyvek [®] suits, nitrile or neoprene gloves, hard hat, safety glasses, hearing protection, full-face respirator (if monitoring indicates a need)
Nonintrusive Construction Activities	Hard hat, safety glasses, work boots, work gloves

Section 8 HEAT/COLD STRESS PROTECTIVE MEASURES

The time frame of the RA Construction project will cause site personnel to potentially be exposed to heat stress. The use of personal protective equipment, such as Tyvek coveralls, may also cause personnel to experience some heat stress conditions, if temperatures exceed 70°F.

8.1 Heat Stress

The US EPA Standard Operating Safety Guides (1992) recommend that a heat stress monitoring program be implemented when employees are wearing impervious clothing and ambient temperatures are 70°F or above. The frequency of monitoring should increase as temperatures increase, and employees should be monitored after each work period when ambient temperatures exceed 85°F. The following monitoring program recommended by the US EPA guide should be used by personnel when ambient temperatures exceed 70°F: **Heart Rate** (HR) should be measured by the radial pulse for 30 seconds as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 110 beats per minute. If the HR is higher, the next work period should be shortened by 33 percent, while the length of the rest period stays the same. If the pulse rate is 110 beats per minute at the beginning of the next rest period, the following work cycle should be shortened by another 33 percent.

All personnel must be instructed on the symptoms of the main heat-related disorders and how to recognize these disorders. These disorders, their symptoms and first-aid measures are outlined below.

- **Heat Rash:** Decreased ability to tolerate heat, raised red vesicles on affected areas, and clothes that chafe. Maintain good personal hygiene and use drying powders or lotions.
- **Heat Cramps:** Muscle spasms and pain in the extremities and abdomen. Rest in cooler area and drink lightly salted fluids. Get medical attention.
- **Heat Exhaustion:** Shallow breathing; pale, cool, moist, clammy skin; profuse sweating; dizziness and lassitude, fainting. Rest in a cool area and drink fluids. Get medical attention prior to returning to work.
- **Heat Stroke:** Red, hot, dry skin; no perspiration; nausea; dizziness and confusion; strong rapid pulse; coma. Cool person off immediately with cool or cold water. Immediate medical assistance must be obtained.

Sometimes it is not practical to follow the guidelines specified above. Therefore, at a minimum, when wearing non-breathable coveralls at temperatures greater than 70°, site personnel shall take a break every two hours and drink plenty of non-alcoholic fluids. The intake of an average of one quart of fluids per hour is recommended. A cool or shaded rest area should be provided.

8.2 Cold Stress

Because the RA Construction work may be conducted during winter, site personnel will be instructed on the signs and symptoms of cold stress and on the methods of preventing cold-related disorders. The two major cold-related disorders are frostbite and hypothermia. The general symptoms are follows:

- **Frostbite** - Sudden blanching of the skin progressing to skin with a waxy or white appearance which is firm to the touch, but the tissue beneath the skin is resilient.
- **Hypothermia** - The symptoms of systemic hypothermia are usually exhibited in five stages as follows:
 - Shivering,
 - Apathy, listlessness, drowsiness, and (sometimes) rapid cooling of the body to less than 95°F,
 - Unconsciousness, glassy stare, slow pulse, and slow respiratory rate,
 - Freezing of the extremities, and
 - Death.

Personnel will watch for signs of frostbite and hypothermia in themselves and team members.

If temperatures drop below 20°F, as measured by the wind chill index (See Wind Chill Chart in Appendix B), thermal clothing will be required. Field activities should be curtailed if equivalent wind chill temperature, as shown on the wind chill chart, is below 0°F, unless the activity is of an emergency nature.

Section 9

ACCIDENT PREVENTION

Preventing accidents is the responsibility of each individual on site. Unsafe or dangerous working conditions shall be reported immediately to the Site Health and Safety Representative (HSR).

Instructing Contractor and Subcontractor site workers in safe work practices and emergency procedures is the responsibility of the contractor and subcontractor(s). This Health and Safety Plan will be made available to contractor(s) for information only. Each RA Construction contractor and subcontractor will be responsible for developing and implementing their own site Health and Safety Plan. Accident prevention will be addressed as a topic during periodic site construction meetings held during the Remedial Action.

Section 9

ACCIDENT PREVENTION

Preventing accidents is the responsibility of each individual on site. Unsafe or dangerous working conditions shall be reported immediately to the Site Health and Safety Representative (HSR).

Instructing Contractor and Subcontractor site workers in safe work practices and emergency procedures is the responsibility of the contractor and subcontractor(s). This Health and Safety Plan will be made available to contractor(s) for information only. Each RA Construction contractor and subcontractor will be responsible for developing and implementing their own site Health and Safety Plan. Accident prevention will be addressed as a topic during periodic site construction meetings held during the Remedial Action.

Section 10

STANDARD OPERATING SAFETY PROCEDURES AND CONTROLS

The following general operating procedures shall be followed by site personnel. These precautionary measures are designed to reduce the risks of inadvertent or accidental chemical exposure or physical injury during on-site operations.

Personal Precautions

- Be familiar with standard operating safety procedures and adhere to all instructions and requirements in the site Health and Safety Plan.
- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in any contaminated or potentially contaminated area. However, a supply of cold water and disposable cups will be located in the decontamination area such that employees will have access to water with any removal of gloves, hat, and respirator (where used). Hands and faces must be thoroughly washed prior to intake.
- Contact lenses shall not be worn in any contaminated area or in any area where safety glasses or respiratory protection are required.
- Hands and face must be thoroughly washed upon leaving the work area. Whenever decontamination procedures for outer garments are in effect, the entire body should be thoroughly washed as soon as possible after the protective garment is removed.
- No facial hair which interferes with a satisfactory respirator fit of the mask-to-face-seal is allowed on personnel required to wear respirators.
- Avoid contact with contaminated or suspected contaminated surfaces. Whenever possible, avoid wading through puddles, pools, mud, etc. Avoid kneeling or sitting on the ground, equipment or drums.
- Personal articles shall be prohibited in any contaminated area.
- Medicine and alcohol can exacerbate the effects from exposure to toxic chemicals. Alcoholic beverage intake should be minimized or avoided on off work hours during field operations. Prescribed drugs should not be taken by personnel on site operations where the potential for absorption, inhalation, or ingestion of toxic substances exists unless specifically approved by a qualified physician. Do not work when ill.
- Identify potential health and safety hazards and contact the appropriate person to initiate corrective action.

Operational Requirements

- Personnel going on-site shall be adequately trained and thoroughly briefed on anticipated hazards, equipment to be worn, safety practices to be followed, emergency procedures, and communications. For site workers who are reasonably expected to encounter exposure hazards, this training entails 40 hour health and safety training along with up-to-date refresher training. This training is not required for workers not expected to encounter potential exposure hazards, such as electricians who will not perform subsurface work.
- Respiratory protective devices and/or protective clothing appropriate to the designated levels of protection shall be worn by all personnel going into areas designated for wearing protective equipment. (See Section 7)
- Personnel on-site shall use the buddy system when in the exclusion zone.
- Visual and/or voice contact shall be maintained between pairs on-site. Entry team members shall remain close together to assist each other during emergencies.
- During continual operations, on-site workers shall act as safety backup to each other. Off-site personnel shall provide emergency assistance.
- Personnel should practice unfamiliar operations prior to doing the actual procedure.
- Entrance and exit locations shall be designated and emergency escape routes delineated. The following warning signals shall be used when necessary:

Hand gripping throat Can't breathe
Grip partner's wrist or
both hands at waist Leave area immediately
Hands on top of head Need assistance
Thumbs up Ok, I am all right, I understand
Thumbs down No, negative
- Communications shall be maintained between field team members at all times. A portable telephone will be located in the support Zone to facilitate emergency response communications.
- Wind indicators visible from the work location should be identified before commencing operations.
- Personnel and equipment in the contaminated area shall be minimized, consistent with effective site operations.
- Decontamination procedures for leaving a contaminated area shall be followed. Hands and face shall be washed prior to work breaks and eating. Work areas and decontamination procedures have been established based on expected site conditioned (see Section 11).

- Report all injuries or work related illnesses to the site HSR or supervisor as soon as possible. An appropriate accident investigation will be conducted and a report provided to the Health and Safety Coordinator.

10.1 Drilling Safety

Drilling safety is the responsibility of each member of the drilling crew. Standard operating safety procedures shall comply with guidelines/recommendations specified in the Drilling Safety Guide (National Drilling Federation) or the Manual of Recommended Safe Operating Procedures and Guidelines for Water Well Contractors and Pump Installers (National Water Well Association) or other recognized drilling industry safety guidelines.

Consultant personnel shall not assist subcontractors with their assigned tasks. This is required in order to limit exposure to hazards associated with these operation.

Although the consultant is not required to provide safety oversight for drillers and other subcontractors, the subcontractor supervisor should be informed of any safety violations, unsafe work practices, or imminent danger observed in the normal performance of assigned observation and documentation duties.

10.2 Adherence to Buddy System

No field operation is without some degree of risk. For this reason, a minimum of two people must be assigned to all task locations and must stay within voice contact at all times.

Section 11

DECONTAMINATION CONTROL MEASURES

Site work zones shall be established to reduce the accidental spread of hazardous substances by workers or equipment. The flow of personnel and equipment among these zones shall be controlled through designated access and egress points by the HSR.

11.1 Site Organization and Control

Site organization and control will be established and maintained according to the recommendations set forth in EPA's "Standard Operating Safety Guide," June 1992, and the NIOSH/OSHA/USCG/EPA "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities," October 1985. Three general areas of operation shall be established to reduce the risk of personnel exposure to hazardous substances. The three areas are:

- Exclusion Zone (Zone A)
- Contamination Reduction Zone (Zone B)
- Support Zone (Zone C)

The dimensions of each area and the safe working distances between each area shall be balanced against practical work considerations and existing field conditions.

11.2 Exclusion Zone

The Exclusion Zone shall initially consist of the entire work site until further delineation is made by the HSR. Since this area shall be considered contaminated, all personnel within the area must use the prescribed levels of personal protection. A checkpoint shall be established at the periphery of the Exclusion Zone to regulate the flow of personnel and equipment in and out of the area. The initial Exclusion Zone boundary (hotline) is based upon the actual presence of wastes or spilled materials, or affected media. The boundary shall be readjusted based on subsequent observations and/or measurements. Any change in the protection level specified by the original HSP shall be approved by the Health and Safety Coordinator (HSC) before being initiated. The hotline shall be well-defined by geographical or physical boundaries and shall be physically secure.

Where the use of respiratory protection is not required during normal work activities, respirators should be immediately available for use should a potential hazard become evident.

Any item taken into the Exclusion Zone shall be considered to be contaminated until carefully inspected by the site HSR and/or decontaminated. All vehicles, equipment, instruments, and materials taken into the Exclusion Zone shall remain in the zone until decontaminated.

11.3 Contamination Reduction Zone

The Contamination Reduction Zone (Zone B) will surround Zone A. This zone shall serve as a buffer between the Exclusion Zone and the Support Zone, and is intended to prevent the spread of contaminants from work areas. All decontamination procedures shall be conducted within this area, along a defined decontamination corridor.

The boundary between the Support Zone and Contamination Reduction Zone is the contamination control line. This boundary separates the area of possible contamination from clean areas. Entry into the Contamination Reduction Zone from the Support Zone will be through a controlled access point. Personnel entering this area shall be wearing the prescribed personal protective equipment. Exit from the contamination Reduction Zone requires the removal of any suspected or known contaminants through compliance with established decontamination procedures.

11.4 Support Zone

The Support Zone (Zone C) shall consist of a staging area in a noncontaminated or clean area. It shall contain the command post for field operations, a first aid station, a telephone, and other elements necessary to support site activities. Normal work clothes and safety shoes can be worn in this area. Location of access points and the command post shall be based upon wind direction, topography and site accessibility. Preferably the command post should be located upwind of the site Exclusion Zone. However, wind direction shift and other conditions may be such that the ideal location based upon wind directions does not exist. The terrain, i.e., woods, water or hills, and available space may limit selection of command post sites.

11.5 Modifications to Site Control

The use of the three-area designation with access/egress control points could with established decontamination procedures provides reasonable assurance against the translocation of contaminants. This system of control is based on a "worst case" situation.

Less stringent site control and decontamination procedures may be utilized based upon field activities and results of monitoring data. Any modification must be approved by the HSC and documented in an amendment to this Health and Safety Plan.

11.6 Decontamination Procedures

Safe personal hygiene practices are discussed in section 10, Standard Operating Safety Procedures and Controls. Decontamination shall be performed under the supervision of the HSR. Personnel and portable field equipment decontamination shall be carried out in the contamination reduction corridor. When working in the Exclusion Zone, care should be taken to avoid contamination of equipment (particularly instruments) whenever possible. Drill rigs, other heavy equipment and ancillary tools will be cleaned at the heavy equipment decontamination area within the Exclusion Zone and adjacent to the Hotline. Critical zones and areas shall be variously identified and delineated with surveyor's tape.

For all egress from the Exclusion Zone, decontamination stations shall consist of:

- Equipment drop
- Boot and glove wash
- Boot and glove rinse
- Tyvek® disposal (into 55-gallon drum or other suitable container)
- Respirator wash and rinse (when conditions mandate respirator use)
- Hand and face wash and rinse

NOTE: Persons subject to decontamination should shower daily as soon as practicable after their work shift. Decontamination procedures will be reviewed for each project phase. Revisions will be included in an amendment to this document.

Monitoring instruments and protective equipment shall be decontaminated if the equipment has been in contact with the ground or splashed with contaminated water, mud or other material.

Decontamination solution shall consist of detergent and water. Rinse solution shall be potable water.

Decontamination and rinse solutions shall be disposed on site under the supervision of the HSR.

Decontamination of drill rigs, vehicles, equipment and ancillary tools and sampling devices shall consist of removal of contaminated soil and mud, and steam cleaning. All vehicles and equipment shall be cleaned before relocation to and use at any other sampling site or work area.

11.7 Medical Emergencies

For physical injuries, first aid treatment shall be given at the site, depending upon the seriousness of the injury. The victim should undergo decontamination, if necessary, unless such procedures interfere with necessary treatment. In life-threatening situations care shall be instituted immediately. Always remove respirators. Protective clothing shall be removed or cut away if this will not cause delays, interfere with treatment, or aggravate the problem. If contaminated protective clothing cannot be removed, wrap the victim in clean materials to help prevent contamination of medical personnel and ambulances.

For chemical exposure emergencies, decontamination procedures shall be followed unless severe medical problems requiring life sustaining measures are evident.

Section 12

EMERGENCY EQUIPMENT

Emergency equipment available on-site shall include:

- First aid kits, (16 unit as specified in National Safety Council Data Sheet No. 202 or equivalent),
- Portable eyewash (15 minute duration)
- Full face respirators - HEPA/organic vapor combination cartridges (GMA-H or GMC-H),
- Portable telephone,
- Fire extinguisher.

In the event of injury, the emergency shall be handled according to the procedures described in Emergency Procedures - Section 13. The first aid kits shall be maintained at the control access point between the decontamination and support zones and in support vehicles.

If the victim cannot be safely moved from the contamination area, first aid necessary to stabilize the victim for safe transport shall be administered at the accident location. Appropriate decontamination of all clothing and equipment shall be followed upon leaving the contaminated area.

Section 13

EMERGENCY AND CONTINGENCY PROCEDURES

Some risk of personal injury or chemical exposure is inherent in hazardous waste site activities. These risks and the effects of unpredictable events such as injury, chemical exposure, fire or explosion shall be minimized by:

- Adhering to good work practices,
- Using personal protective equipment appropriate for existing field conditions,
- Performing adequate monitoring of individual and ambient field conditions,
- Staying alert both to personal performance and to that of co-workers.

An emergency situation is considered to exist if:

- Any member of the field crew is injured in an accident,
- Any member of the field crew experiences or exhibits any adverse effects or symptoms of chemical exposure,
- Safety monitoring indicates site conditions more hazardous than anticipated or that an immediate danger to life or health exists.

13.1 General Emergency Procedures

- In the event that any member of the field crew experiences any adverse effects or symptoms of exposure while on the scene, the entire field crew shall immediately halt work and act according to the instructions provided by the HSR.
- The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated, shall result in the evacuation of the field team and re-evaluation of the hazard and the level of protection required.
- In the event that any member of the field crew experiences any adverse effects or symptoms of exposure while on the site, the entire field crew shall immediately halt work and act according to the instructions provided by the site HSR. Follow-up action shall be taken to correct the situation that caused the accident. The HSR then shall complete an Accident Report.

13.2 Personal Injury

Site personnel will be trained in American Red Cross first aid procedures and shall administer appropriate first aid treatment, including CPR, in emergency situations. The following general emergency procedures shall be carried in the event of injury:

- (1) Notify the HSR of the incident.
- (2) If the victim can be moved safely, remove him/her from the contaminated zone to the decontamination zone using established control points.
- (3) Administer first aid.
- (4) Transport victim to nearest hospital or emergency medical center or call for ambulance transport, as appropriate.

NOTE: The HSR shall direct the removal of injured personnel from the contaminated zone and shall approve any necessary deviation from established decontamination procedures. Such deviation shall be based upon the severity or life threatening nature of the injury.

- (5) Notify the HSC of the incident and describe the emergency response actions taken. A follow-up written report will be provided to the HSC and the Project Manager.

13.3 Chemical Exposure

Before entering the contaminated zone, all site personnel shall be thoroughly acquainted with the types of toxic/hazardous chemicals present on site and their potential concentrations. The following general procedures shall be followed for chemical exposure emergencies:

- (1) Move the victim from the immediate area of exposure/contamination, taking precautions to prevent additional exposure of other individuals.
- (2) Notify the HSR of the exposure incident.
- (3) If the victim can be moved safely, proceed to the decontamination zone through established control points.
- (4) Decontaminate clothing or remove clothing if safe to do so.
 - For skin or eye contact, thoroughly wash affected areas with water (eyes should be flushed for at least 15 minutes).
 - For inhalation exposure, ensure that victim has adequate fresh air.

- (5) Administer additional first aid treatment as appropriate.
- (6) Transport victim to nearest hospital or emergency medical center or call for ambulance transport as appropriate.

NOTE: The site HSR shall direct the removal of injured personnel from the contaminated zone and shall approve any necessary deviation from established decontamination procedures. Such deviation shall be based upon the security or life threatening nature of the injury.

- (7) Notify the HSC of the incident and describe the emergency response actions taken.

13.4 Fire or Explosion

In the event of a fire or explosion:

- (1) Immediately evacuate injured personnel and leave the area,
- (2) Administer first aid as appropriate,
- (3) Notify emergency services,
- (4) Notify the HSC.

13.5 Emergency Contacts

The appropriate contact(s) from the following list shall be made for all emergency situations.

<u>Emergency Service</u>	<u>Telephone</u>
Fire	911/487-2747
EMS	911/487-2747
Police	911/487-2747
Sheriff	911/487-2747
Highway Patrol	911/489-3116
Upstate Carolina Medical Center	487-4271 (Main) 487-1544 (ER)

NOTE: For ambulance, fire or police contacts, give the name of the road and the nearest intersection. The portable telephone on site will be used for emergency notifications. Upstate Carolina Medical Center is located at 1530 N. Limestone Street in Gaffney. Take a right from the site onto Burnt Gin Road (Hwy 72). Follow Highway 72 to Highway 18 and take a left. Follow Highway 18 into Gaffney. Turn right on Limestone Street. Follow Limestone Street to Limestone Street Extension. The hospital is on the right. (Refer to Appendix B for Emergency Route Map.) An approximate distance from the Site to the Hospital is 12 miles and takes approximately 15 minutes travel time.

After contacting emergency services, project contacts designated at the beginning of this Health and Safety Plan will be notified.

13.6 Spill Control Contingency Plan

Solid materials that are spilled will be scooped up, placed in appropriate containers and held for disposal. Spilled liquids will be neutralized or properly containerized for disposal. Prior to spill clean up, the Health and Safety Coordinator will be consulted to confirm that employees are protected during that work.

Section 14

PERSONNEL TRAINING

In order to be in compliance with OSHA regulations, all personnel whose duties include participation in job-related activities on these sites, that involves the reasonable possibility of employee exposure, must be able to document "a minimum of 40 hours of initial instruction off the site, and a minimum of three days of actual field experience under the direct supervision of a trained, experienced supervisor." Activities not anticipated to exhibit a reasonable possibility of chemical exposure include surface electrical and piping activities include surface electrical and piping activities, and bushhogging of the site. Forty hours of training is not required for these personnel.

Site-specific training shall be carried out by the HSC or a designee before any employee enters the site. This shall consist of a review of the specific chemicals of concern, risks, symptoms of exposure and an overview to include delineation of work zones, access, decontamination protocols, safety procedures, and emergency contacts.

Any personnel not initially cleared for site entry will be provided a similar briefing at the site by the HSR before admittance into the Exclusion Zone is permitted.

Section 15

MEDICAL SURVEILLANCE

Medical surveillance is required for those site workers to whom there is a reasonable possibility of chemical exposure. The Medical Surveillance Program is a core element of the Health and Safety Plan that provides for maximum assurance for employee as well as liability protection. The intent of this program is to detect deleterious consequences of occupational exposure to hazardous substances and physical stresses, particularly those associated with the work environment at hazardous waste sites. The Medical Surveillance Program is designed to monitor specific physiological conditions and mechanisms that may be affected by non-episodic exposure as well as to provide acute or episodic medical care as needed.

At a hazardous waste site, the most obvious threat to workers may be the potential exposure to hazardous chemicals. A rational, well-managed PPE program will minimize these exposures to the extent that exposure remains within safe limits. Medical surveillance is an OSHA requirement and is necessary for several reasons. First, no matter how diligent are the training, supervision and maintenance efforts, incorrect use and the malfunction of PPE remain possible. In addition, no one piece of protective equipment is capable of providing protection against all threats, and no PPE is capable of providing absolute protection against even one threat, or for prolonged periods of time at a given level of threat. Finally, there are the less obvious threats inherent in the use of PPE. These include the inhibition and added physiological burden of wearing suits, gloves, boots, respirators, etc., while performing other tasks that of themselves may be strenuous. Also, vapor barrier protective clothing can prevent evaporation of sweat thus causing metabolic heat to be stored in the body and creating the threat of heat injury.

The Medical Surveillance Program has been developed using OSHA, NIOSH, EPA, CDC, USCG, university, and industrial data sources to address the categories of hazards outlined above, and specifically in those manifestations that may be encountered in hazardous waste operations by site personnel.

All personnel working on these sites who are required by this section to participate in a medical surveillance program will have had a pre-employment physical examination conducted by an occupational health physician and, on the basis of this examination, will have been certified as being fit for duty on potentially hazardous sites. This examination consist of a minimum of the following items:

ASSESSMENTS	PROCEDURES
Health history	Hb/Hct
Anthropomorphic measurements	Urine
Height	WBC
Weight	
Pulse	Electrocardiogram (if over 50 years of age or indicated by physiological condition)
Respiration	
Blood Pressure	Multi-Chem profile (SMA 20)
Sensory Screening	Albumin
Vision	Glucose
Hearing	Alkaline Phosphatase
General assessment	ALT (SGPT)
Physical	AST (SGOT)
Social	Phosphorus
Psychological	Bilirubin, total
Nutritional	Potassium
	BUN
	Protein, total
	BUN/Creatinine Ratio
	Sodium
	Calcium
	Triglycerides
	Chloride
	Uric Acid
	Cholesterol
	Creatinine
	Chest X-ray, pa.
	Pulmonary function (spirometry) exam

In addition to the pre-employment and exposure-specific annual examinations, the Medical Surveillance Program includes provisions for pre-placement, periodic and exit examinations for specific sites with identifiable hazards of high potential exposure levels. However, at these sites, the hazard assessment and risk analysis presented in Sections 4 and 5 of this plan do not indicate health risks sufficient to warrant this additional monitoring beyond the standard medical surveillance program.

Unscheduled medical examinations will be conducted, however, in the unlikely event of unusual exposures or accidents.

All medical records are maintained with the Human Resources (HR) Manager and the clinic performing the examinations, and are accessible, within the limits of the Privacy Act, through written requests to the Human Resources Manager.

Section 16

RECORDKEEPING

Logs and reports sufficient to document the implementation and execution of the personnel protection programs shall be maintained. This documentation shall consist of medical surveillance files, training files, daily logs and accident reports.

16.1 Medical Surveillance

Confidential medical surveillance files are maintained by the Human Resources Manager. These files document employee participation in the medical surveillance program and fitness to work on hazardous sites. The Medical Clinic maintains medical records along with the Human Resources Manager. Access to these files and records is controlled by the HR Manager.

16.2 Training

Documentation of employee training is maintained in the Health and Safety files under the direction of the HSR. These files document employee attendance, level of training and follow-up; or refresher instruction.

16.3 Work Logs

Daily work logs shall be maintained by the HSR. Copies of daily logs shall be forwarded to the Project Manager or the HSC on request. The daily log shall contain:

- Date,
- Area(s) or site(s) worked,
- List of employees by area and hours exposed,
- Personal protective equipment utilized by employees,
- Results of monitoring tests,
- Waste materials removed from work area(s),
- List of equipment decontaminated, and
- Description of special or unusual events or incidents, including all first aid treatments not otherwise reportable.

Daily work logs shall be checked and approved by the HSR. Any incident resulting in a work stoppage shall be fully documented in a report prepared by the HSO and submitted to the HSC and the Project Manager.

16.4 Accident Reporting

In addition to descriptions in the daily log and work stoppage reports, any accident and/or chemical exposure incident shall be investigated, analyzed and documented in an accident investigation report submitted to the HSC and the Project Manager. These reports, prepared by the HSR in consultation with the HSC shall contain a full description and analysis of the incident, including exposure work-hours and a log of occupational injuries and illnesses (OSHA Form 200 or equivalent as prescribed by 29 CFR 19904).

Formal accident reports shall be prepared for any diagnosed illness or injuries that result in a lost work day or fatality. The accident report shall identify all contributing causes and recommend future hazard control measures to reduce the risk of recurrence.

Persons on site are responsible for reporting all injuries as soon as possible to the HSR or the HSC.

APPENDIX A
MATERIAL SAFETY DATA SHEETS (MSDSs)

-> d 2 all

L9 ANSWER 2 OF 11

 *
 * MSDS Canadian Centre for Occupational Health and Safety *
 *

AN 305454 MSDS-CCOHS

PRODUCT NAME(S): ***ACETONE***

PRODUCT IDENTIFICATION: Msds No: 497

MANUFACTURER(S): BP Chemicals Inc

Newburg Road
 Post Office Box 741
 Hackettstown New Jersey
 U.S.A. 07840
 Telephone: 800-272-4367 (GENERAL ASSISTANCE)
 908-813-1155 (GENERAL ASSISTANCE)

Emergency Telephone: 800-362-8059 (BP America in Ohio)
 (24-HOUR)
 800-321-8642 (Outside Ohio) (24-HOUR)
 800-424-9300 (CHEMTREC Assistance)
 (24-HOUR)

SUPPLIER(S)/DISTRIBUTOR(S): BP America

200 Public Square
 Cleveland Ohio
 U.S.A. 44114-2375

Emergency Telephone: 800-362-8059 (In Ohio)
 800-321-8642 (Outside Ohio)
 800-424-9300 (CHEMTREC Assistance)

DATE OF MSDS: 30 May 1990

24-HOUR EMERGENCY ASSISTANCE	GENERAL ASSISTANCE	NFPA FIRE HAZARD
BP America(In Ohio):800-362-8059	800-272-4367	Flammability: 3
(Outside Ohio):800-321-8642	908-813-1155	Health : 1
CHEMTREC Assistance:800-424-9300		Reactivity : 0
		Spl.Hazards:

MSDS Number > 497

MANUFACTURER/SUPPLIER:

BP Chemicals Inc.

ADDRESS: Newburg Road, P.O. Box 741, Hackettstown, NJ 07840

----- PRODUCT IDENTIFICATION -----ID-

TRADE NAME:

AC 3E

Date: 05/30/90

CAS NUMBER: 67-64-1

SYNONYM(S):

DIMETHYLFORMALDEHYDE; DIMETHYLKETAL; DIMETHYL
KETONE; PROPANONE; 2-PROPANONE

CHEMICAL FAMILY:

KETONE, ALIPHATIC

MOLECULAR FORMULA: CH₃COCH₃

MOLECULAR WEIGHT: 58.08

PRODUCT CODE: NA

HIERARCHY: NA

PRODUCT HAZARD SUMMARY

PH-

HEALTH

CAUTION!

MAY BE HARMFUL IF SWALLOWED OR INHALED

MAY BE IRRITATING TO SKIN, EYES AND RESPIRATORY TRACT

OVEREXPOSURE MAY CAUSE ADVERSE CNS EFFECTS

FLAMMABILITY

DANGER!

EXTREMELY FLAMMABLE LIQUID AND VAPORS

VAPOR MAY CAUSE FLASH FIRE

REACTIVITY

STABLE

PRODUCT HEALTH HAZARD INFORMATION

HH-

INGESTION:

SLIGHTLY TOXIC. Mouse oral LD₅₀ = 3,000 mg/kg. May cause gastrointestinal disturbances. Symptoms may include irritation, nausea, vomiting and diarrhea. Aspiration into lungs may cause pneumonitis. Exposure may cause symptoms similar to those listed under "Inhalation" (see Inhalation Section).

SKIN:

PRACTICALLY NON-TOXIC. Rabbit dermal LD₅₀ = 20 gm/kg. SLIGHTLY TO MODERATELY IRRITATING. Repeated or prolonged contact may result in defatting, redness, itching, inflammation, cracking and possible secondary infection.

EYE:

SLIGHTLY TO MODERATELY IRRITATING. Direct contact may cause irritation, corneal edema and temporary corneal opacity. Exposure to vapors, fumes or mists may cause irritation.

INHALATION:

May cause respiratory tract irritation. May cause harmful central nervous system effects. Effects may include excitation, euphoria, headache, dizziness, drowsiness, blurred vision, fatigue, tremors, convulsions, loss of consciousness, coma, respiratory arrest and death. May also cause blood chills and liver and kidney damage.

SPECIAL TOXIC EFFECTS:

Avoid simultaneous exposures to acetone and haloalkanes, such as chloroform,

trichloroethane and carbon tetrachloride. Coexposure greatly increases the liver and kidney toxic effects of these haloalkanes, leading to hepatitis and kidney failure. Consumption of alcoholic beverages may enhance toxic effects.

Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage (sometimes referred to as solvent or painters' syndrome). Intentional misuse by deliberately concentrating and inhaling this product may be harmful or fatal.

----- FIRST AID -----FA--

INGESTION:

If victim is conscious, give 1-3 glasses of water or milk and induce vomiting. Do not make an unconscious person vomit. Keep affected person warm and at rest. Get immediate medical attention.

SKIN CONTACT:

Remove contaminated clothing immediately. Wash area of contact thoroughly with soap and water. Get medical attention if irritation persists.

EYE CONTACT:

Flush immediately with large amounts of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Get medical attention.

INHALATION:

Remove exposed person from source of exposure. If not breathing, ensure open airway and institute cardiopulmonary resuscitation (CPR). If breathing is difficult, administer oxygen if available. Get immediate medical attention.

----- NOTES TO PHYSICIAN -----PN--

Remove ingested acetone by gastric lavage or emesis. Supportive measures for acidosis and respiratory failure may be necessary. Rapid recovery should not be expected. Consult standard references for specific treatment information.

----- PERSONAL PROTECTION INFORMATION -----PI--

EYE PROTECTION:

Avoid eye contact with this material. Wear safety glasses or chemical goggles. Provide an eyewash station in the work area. Do not wear contact lenses when working with this substance.

SKIN PROTECTION:

Avoid skin contact. When working with this substance, wear appropriate chemical protective gloves. Depending upon conditions of use, additional protection may be necessary such as face shield, apron, armcovers, etc.

RESPIRATORY PROTECTION:

If exposure limits are exceeded or if irritation is experienced, NIOSH approved respiratory protection should be worn. Ventilation and other forms of engineering controls are often the preferred means for controlling chemical exposures. Respiratory protection may be needed for non-routine or emergency situations.

----- PHYSICAL PROPERTIES -----PR--

BOILING POINT: 56.000 C (133 F)
SPECIFIC GRAVITY: 0.790 @ 20/4 C

MELTING POINT: -95.000 C (-139 F)
 % ATILE: 100.000
 VAPOR PRESSURE: 181.000 MM HG @ 20 C
 EVAPORATION RATE (WATER-1): ND
 VAPOR DENSITY (AIR-1): 2.000
 VISCOSITY: 0.337 CP @ 15 C
 % SOLUBILITY IN WATER: SOLUBLE
 POUR POINT: NA
 pH: 7.000 (1 VOL. ACETONE IN 1 VOL. WATER)
 APPEARANCE/ODOR:
 CLEAR, COLORLESS LIQUID WITH A SWEET, PUNGENT ODOR.

----- FIRE AND EXPLOSION DATA -----

FE-

FLASH POINT: -17.000 C (1.4 F) CC
 AUTOIGNITION TEMPERATURE: 465.000 C (869 F)
 FLAMMABILITY LIMITS IN AIR (% BY VOL.) LOWER:
 2.600
 FLAMMABILITY LIMITS IN AIR (% BY VOL.) UPPER:
 12.800

BASIC FIREFIGHTING PROCEDURES:

Use dry chemical, "alcohol" foam, or carbon dioxide to extinguish fire. Water may be ineffective but should be used to cool fire-exposed containers, structures and to protect personnel. If leak or spill has not ignited, ventilate area and use water spray to disperse gas or vapor and to protect personnel attempting to stop a leak. Use water to dilute spills and to flush them away from sources of ignition. Do not flush down public sewers.

UN. AL FIRE AND EXPLOSION HAZARDS:

Dangerous when exposed to heat or flame. Containers may explode in heat of fire. Vapors form flammable or explosive mixtures with air at room temperature. Vapor or gas may spread to distant ignition sources and flash back. Vapors may concentrate in confined areas. Runoff to sewer may cause fire or explosion hazard. Irritating or toxic substances may be emitted upon thermal decomposition. Exposed firefighters should wear self-contained breathing apparatus with full face mask.

----- REACTIVITY DATA -----

RD-

STABILITY/INCOMPATIBILITY:

Stable under normal conditions of use. Avoid contact with oxidizers and reducing agents.

HAZARDOUS REACTIONS/DECOMPOSITION PRODUCTS:

Combustion may produce CO and CO2.

----- ENVIRONMENTAL INFORMATION -----

EI-

SPILL OR RELEASE TO THE ENVIRONMENT:

If your facility or operation has an "Oil or Hazardous Substance Contingency Plan", activate its procedures.

-- Take immediate steps to stop and contain the spill. Caution should be exercised regarding personnel safety and exposure to the spilled material.

-- For technical advice and assistance related to chemicals, contact CHEMTREC (800/424-9300) and your local fire department.

-- Notify the National Response Center, if required.

.....
Emergency Action:

Keep unnecessary people away. Stay upwind; keep out of low areas. Isolate hazard area and deny entry. (Also see Personal Protection Information section.) Isolate for 1/2 mile in all directions if tank or tankcar is involved in fire.

.....
Spill or Leak Procedure:

No flares, smoking or flames in hazard area. Stop leak if you can do it without risk. Use water spray to reduce vapors. Small Spills: Take up with sand or other noncombustible absorbent material or other sorbent known to be compatible, then flush area with water. Large Spills: Dike far ahead of spill for later disposal.

.....
Notification:

The reportable quantity for this material is 5000 pound(s).

Any spill or other release, or substantial threat of release, of this material to the air, water, or land (unless entirely contained in the workplace) equal to or in excess of the reportable quantity must be reported immediately to the National Response Center (800/ 424-8802) as required by U.S. Federal Law. Failure to report may result in substantial civil and criminal penalties.

.....
WASTE DISPOSAL:

This substance, when discarded or disposed of, is a hazardous waste according to Federal regulations (40 CFR 261). It is listed as Hazardous Waste Number F001 and U002, so listed due to its ignitability.

The transportation, storage, treatment, and disposal of this waste material must be conducted in compliance with 40 CFR 262, 263, and 264. Disposal can occur only in properly permitted facilities. Check state and local regulations for any additional requirements.

.....
SARA TITLE III INFORMATION:

Listed below are the hazard categories for the Superfund Amendments and Reauthorization Act (SARA) Section 311/312 (40 CFR 370):

Immediate Hazard: X
Delayed Hazard: X
Fire Hazard: X
Pressure Hazard: -
Reactivity Hazard: -

The product contains the following toxic chemical(s) subject to the reporting requirements of the Superfund Amendments and Reauthorization Act (SARA) Section 313 (40 CFR 372):

Component:	CAS Number:	Maximum %
Acetone	67-64-1	100.000

.....
ADDITIONAL ENVIRONMENTAL REGULATORY INFORMATION:

There may be specific regulations at the local, regional or state level that pertain to this material.

----- SPECIAL PRECAUTIONS/SUPPLEMENTAL INFORMATION -----SP-
HA ING/STORAGE:

Store in tightly closed containers in cool, dry, isolated, well-ventilated area away from heat, sources of ignition and incompatibles. Ground lines and equipment used during transfer to reduce the possibility of static

spark-initiated fire or explosion.

Empty containers may contain toxic, flammable/combustible or explosive residue or vapors. Do not cut, grind, drill, weld or reuse containers unless adequate precautions are taken against these hazards.

----- TRANSPORTATION REQUIREMENTS -----TR-
 D.O.T. HAZARD CLASS (49 CFR 172.101): FLAMMABLE LIQUID
 D.O.T. PROPER SHIPPING NAME (49 CFR 172.101): ACETONE
 D.O.T. LABELS REQUIRED (49 CFR 172.101): FLAMMABLE LIQUID
 D.O.T. PLACARDS REQUIRED: FLAMMABLE
 BILL OF LADING DESCRIPTION: ACETONE, FLAMMABLE LIQUID, UN-1090 "RQ"
 UN/NA CODE: UN 1090

----- INGREDIENTS/HEALTH HAZARD INFORMATION -----IN-

COMPONENT	@	CAS NO.	@	%	@ EXPOSURE LIMITS - REF.
Acetone		67-64-1		99.99-100	750 ppm (1780 mg/M3) TLV; 1000 ppm (2380 mg/M3) STEL (ACGIH) 750 ppm (1780 mg/M3) PEL; 1000 ppm (2380 mg/M3) STEL (OSHA) 250 ppm (590 mg/M3) 10-ho ur TWA (NIOSH)

 REVISION DATE: 30-may-1990 REPLACES SHEET DATED: 01-feb-1990
 COMPLETED BY: BP CHEMICAL HSEQ DEPARTMENT

NOTICE: "Information contained in this publication, while accurate to the best of the knowledge and belief of the British Petroleum Company p.l.c and its subsidiary companies ("BP"), is not intended and should not be construed as a warranty or representation for which BP assumes any legal responsibility. Any information or advice obtained from BP otherwise than by means of this publication and whether relating to BP materials or other materials, is also given in good faith. However, it remains at all times the responsibility of the customer to ensure that BP materials are suitable for the particular purpose intended. Insofar as materials not manufactured or supplied by BP are used in conjunction with or instead of BP materials, the customer should ensure that he has received from the manufacturer or supplier all technical data and other information relating to such materials. BP accepts no liability whatsoever (except otherwise provided by law) arising out of the use of information supplied, the application, adaptation or processing of the products described herein, the use of other materials in lieu of BP materials or the use of BP materials in conjunction with such other materials."

OHS01920

MATERIAL SAFETY DATA SHEET

OCCUPATIONAL HEALTH SERVICES, INC.
11 WEST 42ND STREET, 12TH FLOOR
NEW YORK, NEW YORK 10036
1-800-445-MSDS (1-800-445-6737) OR
1-212-789-3535

FOR EMERGENCY SOURCE INFORMATION
CONTACT: 1-615-366-2000

SUBSTANCE IDENTIFICATION

CAS NUMBER: 11097-69-1
RTECS NUMBER: TQ1360000

SUBSTANCE: AROCLOR 1254

TRADE NAMES/SYNONYMS:

PCB 1254; POLYCHLORINATED BIPHENYL (AROCOR 1254); POLYCHLORINATED BIPHENYL;
PCB; CHLORODIPHENYL (54% CL); CHLOROBIPHENYLS; PCBS; STCC 48661666; UN 2315;
OHS01920

CHEMICAL FAMILY:

HALOGEN COMPOUND, AROMATIC

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=1 REACTIVITY=0 PERSISTENCE=3

NFPA RATINGS (SCALE 0-4): HEALTH=1 FIRE=1 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: AROCLOR 1254
CAS# 11097-69-1

PERCENT: 100.0

OTHER CONTAMINANTS: MAY CONTAIN 0-2 PPM CHLORINATED DIBENZOFURANS

EXPOSURE LIMITS:

AROCOR 1254:

0.5 MG/M3 OSHA TWA (SKIN)
0.5 MG/M3 ACGIH TWA (SKIN)
1.0 UG/M3 NIOSH RECOMMENDED TWA
0.05 PPM (0.5 MG/M3) DFG MAK TWA (SKIN);
0.25 PPM (2.5 MG/M3) DFG MAK 30 MINUTE PEAK, AVERAGE VALUE, 1 TIME/SHIFT

MEASUREMENT METHOD: PARTICULATE FILTER/FLORISIL(R) TUBE; HEXANE; GAS
CHROMATOGRAPHY WITH ELECTRON CAPTURE DETECTION; (NIOSH VOL. III # 5503,
PCBS).

1 POUND CERCLA SECTION 103 REPORTABLE QUANTITY
SUBJECT TO CALIFORNIA PROPOSITION 65 CANCER AND/OR REPRODUCTIVE TOXICITY
WARNING AND RELEASE REQUIREMENTS-(OCTOBER 1,1989)

PHYSICAL DATA

DESCRIPTION: COLORLESS TO PALE YELLOW, VISCOUS LIQUID WITH A MILD HYDROCARBON

ODOR. BOILING POINT: 689-734 F (365-390C) MELTING POINT: 50 F (10 C)
SPECIFIC GRAVITY: 1.50 @ 25 C VISCOSITY: 1400-2500 SUS
VAPOR PRESSURE: NEGLIGIBLE SOLUBILITY IN WATER: VERY SLIGHTLY SOLUBLE
SOLVENT SOLUBILITY: SOLUBLE IN OILS AND MOST ORGANIC SOLVENTS; INSOLUBLE
IN GLYCEROL AND GLYCOLS.

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
SLIGHT FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

FLASH POINT: 432 F (222 C) (CC) FLAMMABILITY CLASS(OSHA): IIIB

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR REGULAR FOAM
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FIREFIGHTING:

MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT WITHOUT RISK. DO NOT SCATTER
SPILLED MATERIAL WITH HIGH-PRESSURE WATER STREAMS. DIKE FIRE-CONTROL WATER
LATER DISPOSAL (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5, GUIDE
PAGE 31).

USE AGENTS SUITABLE FOR TYPE OF SURROUNDING FIRE. AVOID BREATHING HAZARDOUS
VAPORS, KEEP UPWIND.

TRANSPORTATION DATA

FINAL RULE ON HAZARDOUS MATERIALS REGULATIONS (HMR, 49 CFR PARTS 171-180),
DOCKET NUMBERS HM-181, HM-181A, HM-181B, HM-181C, HM-181D AND HM-204.
EFFECTIVE DATE OCTOBER 1, 1991. HOWEVER, COMPLIANCE WITH THE REGULATIONS IS
AUTHORIZED ON AND AFTER JANUARY 1, 1991. (55 FR 52402, 12/21/90)

EXCEPT FOR EXPLOSIVES, INHALATION HAZARDS, AND INFECTIOUS SUBSTANCES, THE
EFFECTIVE DATE FOR HAZARD COMMUNICATION REQUIREMENTS IS EXTENDED TO
OCTOBER 1, 1993. (56 FR 47158, 10/18/91)

U.S. DEPARTMENT OF TRANSPORTATION SHIPPING NAME-ID NUMBER, 49 CFR 172.101:
POLYCHLORINATED BIPHENYLS-UN 2315

U.S. DEPARTMENT OF TRANSPORTATION HAZARD CLASS OR DIVISION, 49 CFR 172.101:
9 - MISCELLANEOUS HAZARDOUS MATERIAL

U.S. DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS, 49 CFR 172.101

AND SUBPART E:
CLASS 9

U.S. DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS:

EXCEPTIONS: 49 CFR 173.155
NON-BULK PACKAGING: 49 CFR 173.202
BULK PACKAGING: 49 CFR 173.240

U.S. DEPARTMENT OF TRANSPORTATION QUANTITY LIMITATIONS 49 CFR 172.101:

PASSENGER AIRCRAFT OR RAILCAR: 100 L
CARGO AIRCRAFT ONLY: 220 L

TOXICITY

AROCLOR 1254:

TOXICITY DATA: 1010 MG/KG ORAL-RAT LD50; 358 MG/KG INTRAVENOUS-RAT LD50;
880 MG/KG INTRAPERITONEAL-MOUSE LD50; MUTAGENIC DATA (RTECS); REPRODUCTIVE
EFFECTS DATA (RTECS); TUMORIGENIC DATA (RTECS).

CARCINOGEN STATUS: HUMAN LIMITED EVIDENCE, ANIMAL SUFFICIENT EVIDENCE (IARC
GROUP-2A FOR POLYCHLORINATED BIPHENYLS); ANTICIPATED HUMAN CARCINOGEN (NTP).
EPIDEMIOLOGIC DATA PROVIDE EVIDENCE OF A RELATIONSHIP BETWEEN EXPOSURE TO
POLYCHLORINATED BIPHENYLS AND THE DEVELOPMENT OF CANCER, ESPECIALLY THE
CONSISTENT EMERGENCE OF HEPATOBILIARY CANCER IN DIFFERENT STUDIES. CERTAIN
POLYCHLORINATED BIPHENYLS PRODUCED BENIGN AND MALIGNANT LIVER NEOPLASMS IN
PRENEOPLASTIC LESIONS AND OF NEOPLASMS OF THE LIVER AND LUNG TUMORS
INDUCED IN RODENTS BY N-NITROSODIETHYLAMINE OR 2-ACETYLAMINOFLUORENE WERE
INCREASED BY ADMINISTRATION OF POLYCHLORINATED BIPHENYLS.

TARGET EFFECTS: HEPATOTOXIN. POISONING MAY ALSO AFFECT THE NERVOUS SYSTEM AND
SKIN.

ACUTE TOXICITY LEVEL: MODERATELY TOXIC BY INGESTION.

AT INCREASED RISK FROM EXPOSURE: PERSONS WITH SKIN DISORDERS AND LIVER
DISEASE.

ADDITIONAL DATA: CONCURRENT EXPOSURE TO CARBON TETRACHLORIDE MAY ENHANCE THE
HEPATOTOXIC EFFECT OF POLYCHLORINATED BIPHENYLS.

HEALTH EFFECTS AND FIRST AID

INHALATION:

AROCLOR 1254:

5 MG/M3 IMMEDIATELY DANGEROUS TO LIFE OR HEALTH. SEE INFORMATION ON
POLYCHLORINATED BIPHENYLS.

**POLYCHLORINATED BIPHENYLS:
IRRITANT/HEPATOTOXIN/CARCINOGEN.**

ACUTE EXPOSURE- INHALATION OF VAPORS OF POLYCHLORINATED BIPHENYLS MAY CAUSE RESPIRATORY TRACT IRRITATION. THEY MAY BE ABSORBED AND RETAINED IN BODY TISSUE.

CHRONIC EXPOSURE- ECZEMA, SKIN BURNING, AND SYSTEMIC EFFECTS HAVE BEEN REPORTED TO OCCUR WHEN AIR LEVELS OF POLYCHLORINATED BIPHENYLS WERE LESS THAN 1 MG/M3. THE SKIN, MUCOUS MEMBRANES, GASTROINTESTINAL TRACT, LIVER, NERVOUS SYSTEM, AND VARIOUS ENZYME SYSTEMS MAY BE AFFECTED. DERMATOLOGIC EFFECTS INCLUDE ERYTHEMATOUS ERUPTIONS WITH PRURITIS, DISCOLORATION OF FINGERNAILS, SKIN THICKENING, SWELLING OF THE EYELIDS, FACE, AND HANDS, EXCESSIVE EYE DISCHARGE, DISTINCTIVE HAIR FOLLICLES, ALOPECIA, AND CHLORACNE. MUCOUS MEMBRANES OF THE EYES AND MOUTH MAY BECOME PIGMENTED. GASTROINTESTINAL EFFECTS MAY INCLUDE NAUSEA, VOMITING, ABDOMINAL PAIN, AND ANOREXIA. LIVER DAMAGE MAY BE INDICATED BY JAUNDICE. ADVERSE EFFECTS ON THE LIVER THAT HAVE BEEN REPORTED IN HUMANS INCLUDE CIRRHOSIS, FATTY DEGENERATIVE NECROSIS, AND YELLOW ATROPHY. COMA AND DEATH MAY FOLLOW SEVERE LIVER DAMAGE. NEUROLOGIC EFFECTS MAY INCLUDE HEADACHE, DIZZINESS, IRRITABILITY, DEPRESSION, FATIGUE, IMPOTENCE, AND JOINT AND MUSCLE PAIN. ENZYME ACTIVITY MAY BE INDUCED OR INHIBITED RESULTING IN UPSET OF NORMAL BIOLOGICAL PROCESSES. UPPER RESPIRATORY TRACT IRRITATION, DECREASED FORCED VITAL CAPACITY, CHEST TIGHTNESS, AND PERSISTENT BODY ODOR HAVE ALSO BEEN REPORTED. POLYCHLORINATED BIPHENYLS WILL ACCUMULATE IN TISSUES AND ORGANS, ESPECIALLY THOSE RICH IN LIPIDS. THEY CROSS THE PLACENTA AND ARE EXCRETED IN BREAST MILK AND MAY EXERT TOXIC EFFECTS ON THE FETUS OR INFANT. LOW MEAN BIRTH WEIGHTS AND MEAN GESTATIONAL AGES WERE OBSERVED IN INFANTS BORN TO WOMEN WITH A HISTORY OF HIGH EXPOSURE TO POLYCHLORINATED BIPHENYLS. EPIDEMIOLOGICAL STUDIES PROVIDE SUGGESTIVE EVIDENCE OF A RELATIONSHIP BETWEEN OCCUPATIONAL EXPOSURE TO POLYCHLORINATED BIPHENYLS AND THE DEVELOPMENT OF HEPATOBILIARY CANCER, MELANOMA, AND CANCER OF THE DIGESTIVE SYSTEM AND OF THE LYMPHATIC AND HEMATOPOIETIC TISSUE.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:

AROCLOR 1254:

SEE INFORMATION ON POLYCHLORINATED BIPHENYLS.

**POLYCHLORINATED BIPHENYLS:
IRRITANT/HEPATOTOXIN.**

ACUTE EXPOSURE- DIRECT CONTACT WITH POLYCHLORINATED BIPHENYLS MAY CAUSE IRRITATION AND DEFAT THE SKIN. THEY MAY BE ABSORBED THROUGH INTACT SKIN AND RETAINED IN BODY TISSUE.

CHRONIC EXPOSURE- REPEATED CONTACT WITH POLYCHLORINATED BIPHENYLS MAY CAUSE CHLORACNE. LIVER DAMAGE MAY BE INDICATED BY JAUNDICE. THE SKIN, MUCOUS MEMBRANES, GASTROINTESTINAL TRACT, LIVER, NERVOUS SYSTEM, AND VARIOUS ENZYME SYSTEMS MAY BE AFFECTED AS DETAILED IN CHRONIC INHALATION EXPOSURE. AN INCREASED INCIDENCE OF SPONTANEOUS ABORTIONS AND STILLBIRTHS WERE

INDUCED IN RHESUS MONKEYS FOLLOWING EXTENDED DERMAL CONTACT. MATERNAL TOXICITY WAS INDICATED BY ALOPECIA, ERYTHEMA AND EDEMA OF THE EYELIDS, AND NONSPECIFIC METABOLIC ABNORMALITIES.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:
AROCOR 1254:
IRRITANT.

SEE INFORMATION ON POLYCHLORINATED BIPHENYLS.

POLYCHLORINATED BIPHENYLS:
IRRITANT.

ACUTE EXPOSURE- VAPORS AND LIQUID MAY CAUSE IRRITATION, AND MAY POSSIBLY BE ABSORBED.

CHRONIC EXPOSURE- PROLONGED OR REPEATED EXPOSURE TO IRRITANTS MAY RESULT IN CONJUNCTIVITIS. EXCESSIVE EYE DISCHARGE AND SWELLING OF THE EYELIDS MAY RESULT FROM SYSTEMIC POISONING.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:
AROCOR 1254:

SEE INFORMATION ON POLYCHLORINATED BIPHENYLS.

POLYCHLORINATED BIPHENYLS:
HEPATOTOXIN/CARCINOGEN.

ACUTE EXPOSURE- POLYCHLORINATED BIPHENYLS MAY BE ABSORBED THROUGH THE GASTROINTESTINAL TRACT AND RETAINED IN BODY TISSUE. A LARGE SINGLE DOSE PRODUCED HEPATIC MICROSOMAL ACTIVITY IN RATS. ANIMALS RECEIVING LETHAL DOSES MAY NOT DIE ACUTELY. DEATH MAY BE DELAYED UP TO THREE MONTHS.

CHRONIC EXPOSURE- REPEATED INGESTION OF POLYCHLORINATED BIPHENYLS MAY AFFECT THE SKIN, MUCOUS MEMBRANES, GASTROINTESTINAL TRACT, LIVER, NERVOUS SYSTEM, AND VARIOUS ENZYME SYSTEMS AS DETAILED IN CHRONIC INHALATION EXPOSURE. ADDITIONAL EFFECTS WERE REPORTED IN HUMANS FOLLOWING INGESTION OF

POLYCHLORINATED BIPHENYLS CONTAMINATED WITH POLYCHLORINATED DIBENZOFURANS INCLUDING FEVER, HEARING DIFFICULTIES, IMMUNOSUPPRESSION, MENSTRUAL DISORDERS IN FEMALES, AND A SIGNIFICANTLY INCREASED RISK OF ALL CANCERS. INTRAUTERINE EXPOSURE RESULTED IN A FETAL SYNDROME WITH CLINICAL SYMPTOMATOLOGY INCLUDING STILLBIRTHS, "COLA COLORED" SKIN, LOW BIRTH WEIGHT, ELEVATED BILIRUBIN, CONJUNCTIVITIS, ENLARGED MEIBOMIAN GLANDS, CHLORACNE, HYPOPLASTIC NAILS, SCALP CALCIFICATION, NATAL TEETH, RETARDED GROWTH AND NEUROLOGIC SIGNS. GROWTH RETARDATION AND NEUROLOGIC SIGNS PERSISTED FOR SEVERAL YEARS. ADDITIONAL EFFECTS THAT HAVE BEEN INDUCED IN ANIMALS FOLLOWING REPEATED INGESTION OF POLYCHLORINATED BIPHENYLS INCLUDE ADRENAL GLAND TOXICITY, BENIGN AND MALIGNANT LIVER TUMORS IN IN RATS AND MICE, AND AN INCREASED INCIDENCE OF SPONTANEOUS ABORTIONS AND STILLBIRTHS IN MONKEYS. TRANSPLACENTAL TRANSFER COUPLED WITH EXPOSURE THROUGH LACTATION CAUSED LOCOMOTOR, HYPERACTIVITY, AND LEARNING ERRORS IN MONKEYS WHICH CORRELATED WITH POLYCHLORINATED BIPHENYL BODY BURDENS.

FIRST AID- TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY. IF VOMITING OCCURS, KEEP HEAD LOWER THAN HIPS TO PREVENT ASPIRATION.

ANTIDOTE:

NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

REACTIVITY:

STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:

AROCOR 1254:

SEE POLYCHLORINATED BIPHENYLS.

POLYCHLORINATED BIPHENYLS:

CHLORINE (LIQUID): EXOTHERMIC REACTION.

OXIDIZERS (STRONG): FIRE AND EXPLOSION HAZARD.

PLASTICS, RUBBER, COATINGS: ATTACKS.

DECOMPOSITION:

THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE TOXIC AND/OR CORROSIVE VAPORS OF HYDROGEN CHLORIDE, CHLORINE, CARBON MONOXIDE, AND CHLORINATED DIBENZOFURANS.

POLYMERIZATION:

HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

****STORAGE****

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

CONDITIONS TO AVOID

MAY BURN BUT DOES NOT IGNITE READILY. AVOID CONTACT WITH STRONG OXIDIZERS, EXCESSIVE HEAT, SPARKS, OR OPEN FLAME.

SPILL AND LEAK PROCEDURES

SOIL SPILL:

DIG HOLDING AREA SUCH AS LAGOON, POND OR PIT FOR CONTAINMENT.

DIKE FLOW OF SPILLED MATERIAL USING SOIL OR SANDBAGS OR FOAMED BARRIERS SUCH AS POLYURETHANE OR CONCRETE.

USE CEMENT POWDER OR FLY ASH TO ABSORB LIQUID MASS.

WATER SPILL:

TRAP SPILLED MATERIAL AT BOTTOM IN DEEP WATER POCKETS, EXCAVATED HOLDING AREAS OR WITHIN SAND BAG BARRIERS.

USE ACTIVATED CARBON TO ABSORB SPILLED SUBSTANCE THAT IS DISSOLVED.

USE SUCTION HOSES TO REMOVE TRAPPED SPILL MATERIAL.

USE MECHANICAL DREDGES OR LIFTS TO EXTRACT IMMOBILIZED MASSES OF POLLUTION AND PRECIPITATES.

THE CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986 (PROPOSITION 65) PROHIBITS CONTAMINATING ANY KNOWN SOURCE OF DRINKING WATER WITH SUBSTANCES KNOWN TO CAUSE CANCER AND/OR REPRODUCTIVE TOXICITY.

OCCUPATIONAL SPILL:

STOP LEAK IF YOU CAN DO IT WITHOUT RISK. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CLEAN, DRY CONTAINERS FOR LATER DISPOSAL. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY.

REPORTABLE QUANTITY (RQ): 1 POUND

THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

PROTECTIVE EQUIPMENT

VENTILATION:

PROCESS ENCLOSURE RECOMMENDED TO MEET PUBLISHED EXPOSURE LIMITS.

RESPIRATOR:

THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO CHEMICAL HAZARDS; NIOSH CRITERIA DOCUMENTS OR BY THE U.S. DEPARTMENT OF LABOR, 29 CFR 1910 SUBPART Z.

THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

AT ANY DETECTABLE CONCENTRATION:

ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.
ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ESCAPE- ANY AIR-PURIFYING, FULL-FACEPIECE RESPIRATOR (GAS MASK) WITH A CHIN-STYLE, FRONT- OR BACK-MOUNTED ORGANIC VAPOR CANISTER HAVING A HIGH-EFFICIENCY PARTICULATE FILTER.

ANY APPROPRIATE ESCAPE-TYPE, SELF-CONTAINED BREATHING APPARATUS.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

CLOTHING:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT ANY POSSIBILITY OF SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:

EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE.

EMERGENCY WASH FACILITIES:

WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES AND/OR SKIN MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN AND QUICK DRENCH SHOWER WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED BY- OCCUPATIONAL HEALTH SERVICES, INC.
CREATION DATE: 10/17/84 REVISION DATE: 10/29/91

OHS01920
11097-69-1
AROCLOL 1254

Copyright 1991 Occupational Health Services, Inc. All Rights Reserved.
Licensed to: fluor daniel inc.
To make unlimited paper copies for internal distribution and use only.

-> d all 8

L1 ANSWER 8 OF 12

*
* MSDS Canadian Centre for Occupational Health and Safety *
*

AN 287899 MSDS-CCOHS

PRODUCT NAME(S): ***BENZENE***

PRODUCT IDENTIFICATION: J.T. BAKER MSDS NUMBER: B0792
PRODUCT CODES: B717,9155,9154,9149,9153,9156,9256

MANUFACTURER(S): J T BAKER CHEMICAL CO
222 RED SCHOOL LANE
PHILLIPSBURG NEW JERSEY
U.S.A. 08865

Emergency Telephone: 908-859-2151
800-424-9300 (CHEMTREC)
800-424-8802 (NATIONAL RESPONSE CENTER)

DATE OF MSDS: 1 May 1989

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

B0792 -06
EFFECTIVE: 05/01/89

BENZENE

PAGE: 1
ISSUED: 03/21/91

J.T.BAKER INC., 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: BENZENE
COMMON SYNONYMS: BENZOL; PHENYL HYDRIDE; COAL NAPHTHA
CHEMICAL FAMILY: AROMATIC HYDROCARBONS
FC LA: C6H6
FORMULA WT.: 78.10
CAS NO.: 71-43-2
NIOSH/RTECS NO.: CY1400000

PRODUCT USE: LABORATORY REAGENT
 PR CT CODES: B717,9155,9154,9149,9153,9156,9256

PRECAUTIONARY LABELING

BAKER SAF-T-DATA* SYSTEM

HEALTH	-	4	EXTREME (CANCER CAUSING)
FLAMMABILITY	-	3	SEVERE (FLAMMABLE)
REACTIVITY	-	2	MODERATE
CONTACT	-	1	SLIGHT

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B
 EXTINGUISHER

U.S. PRECAUTIONARY LABELING

POISON DANGER

EXTREMELY FLAMMABLE. CAUTION: CONTAINS BENZENE, CANCER HAZARD. HARMFUL IF
 SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN. EXCEPTIONAL HEALTH HAZARD: READ
 MATERIAL SAFETY DATA SHEET.
 KEEP AWAY FROM HEAT, SPARKS, FLAME. DO NOT GET IN EYES, ON SKIN, ON CLOTHING.
 DO NOT BREATHE VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE
 VENTILATION. WASH THOROUGHLY AFTER HANDLING. KEEP CONTAINERS OUT OF SUN AND
 AWAY FROM HEAT. IN CASE OF FIRE, USE ALCOHOL FOAM, DRY CHEMICAL, CARBON
 DIOXIDE - WATER MAY BE INEFFECTIVE. IN CASE OF SPILL, SOAK UP WITH SAND OR
 EARTH.

CONTINUED ON PAGE: 2

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
 MATERIAL SAFETY DATA SHEET
 24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
 CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

B0792 -06
 EFFECTIVE: 05/01/89

BENZENE

PAGE: 2
 ISSUED: 03/21/91

PRECAUTIONARY LABELING (CONTINUED)

INTERNATIONAL LABELING

HIGHLY FLAMMABLE. TOXIC BY INHALATION AND IN CONTACT WITH SKIN. MAY CAUSE CANCER.
KEEP CONTAINER IN A WELL-VENTILATED PLACE. KEEP AWAY FROM SOURCES OF IGNITION
- NO SMOKING. DO NOT EMPTY INTO DRAINS. AVOID EXPOSURE - OBTAIN SPECIAL INSTRUCTIONS BEFORE USE.

SAF-T-DATA* STORAGE COLOR CODE: RED STRIPE (STORE SEPARATELY)

SECTION II - COMPONENTS

COMPONENT	CAS NO.	WEIGHT %	OSHA/PEL	ACGIH/TLV
BENZENE	71-43-2	99-100	1 PPM	10 PPM

SECTION III - PHYSICAL DATA

BOILING POINT: 80 C (176 F) (AT 760 MM HG)	VAPOR PRESSURE (MMHG): 74.6 (20 C)
MELTING POINT: 6 C (42 F) (AT 760 MM HG)	VAPOR DENSITY (AIR=1): 2.77
SPECIFIC GRAVITY: 0.88 (H2O=1)	EVAPORATION RATE: N/A
SOLUBILITY(H2O): NEGLIGIBLE (<0.1%)	% VOLATILES BY VOLUME: 100 (21 C)
PH: N/A	
ODOR THRESHOLD (P.P.M.): N/A	PHYSICAL STATE: LIQUID
COEFFICIENT WATER/OIL DISTRIBUTION: N/A	
APPEARANCE & ODOR: CLEAR, COLORLESS LIQUID. AROMATIC ODOR.	

CONTINUED ON PAGE: 3

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
MATERIAL SAFETY DATA SHEET
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

B0792 -06
EFFECTIVE: 05/01/89

BENZENE

PAGE: 3
ISSUED: 03/21/91

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP): -11 C (12 F) NFPA 704M RATING: 2-3-0

AUTOIGNITION TEMPERATURE: 497 C (928 F)

FLAMMABLE LIMITS: UPPER - 8.0 % LOWER - 1.3 %

FIRE EXTINGUISHING MEDIA

USE ALCOHOL FOAM, DRY CHEMICAL OR CARBON DIOXIDE. (WATER MAY BE INEFFECTIVE.)

SPECIAL FIRE-FIGHTING PROCEDURES

FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE & EXPLOSION HAZARDS

VAPORS MAY FLOW ALONG SURFACES TO DISTANT IGNITION SOURCES AND FLASH BACK. CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE. CONTACT WITH STRONG OXIDIZERS MAY CAUSE FIRE.

TOXIC GASES PRODUCED

CARBON MONOXIDE, CARBON DIOXIDE

EXPLOSION DATA-SENSITIVITY TO MECHANICAL IMPACT

NONE IDENTIFIED.

EXPLOSION DATA-SENSITIVITY TO STATIC DISCHARGE

NONE IDENTIFIED.

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 30 MG/M3 (10 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): NOT ESTABLISHED

PERMISSIBLE EXPOSURE LIMIT (PEL): 3 MG/M3 (1 PPM)

PEL (CEILING) - 25 PPM.

CONTINUED ON PAGE: 4

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T

24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

B0792 -06
EFFECTIVE: 05/01/89

BENZENE

PAGE: 4
ISSUED: 03/21/91

SECTION V - HEALTH HAZARD DATA (CONTINUED)

TOXICITY OF COMPONENTS

ORAL RAT LD50 FOR BENZENE	4894 MG/KG
ORAL MOUSE LD50 FOR BENZENE	4700 MG/KG
INTRAPERITONEAL RAT LD50 FOR BENZENE	2.89 MG/KG
INHALATION MOUSE LC50 FOR BENZENE	9980 PPM
CARCINOGENICITY: NTP: YES IARC: YES Z LIST: NO OSHA REG: NO	

CARCINOGENICITY

THIS SUBSTANCE IS LISTED AS AN ACGIH SUSPECTED HUMAN CARCINOGEN, A NTP HUMAN CARCINOGEN, AND AN IARC HUMAN CARCINOGEN (GROUP 1)

REPRODUCTIVE EFFECTS

NONE IDENTIFIED.

EFFECTS OF OVEREXPOSURE

INHALATION: HEADACHE, NAUSEA, VOMITING, DIZZINESS, NARCOSIS, RESPIRATORY FAILURE, LOW BLOOD PRESSURE, CENTRAL NERVOUS SYSTEM DEPRESSION, SEVERE IRRITATION OR BURNS OF RESPIRATORY SYSTEM, PULMONARY EDEMA, LUNG INFLAMMATION

SKIN CONTACT: IRRITATION, PROLONGED CONTACT MAY CAUSE DERMATITIS

EYE CONTACT: IRRITATION, MAY CAUSE TEMPORARY CORNEAL DAMAGE

SKIN ABSORPTION: NONE IDENTIFIED

INGESTION: HEADACHE, NAUSEA, VOMITING, DIZZINESS, GASTROINTESTINAL IRRITATION, BLURRED VISION, LOW BLOOD PRESSURE

CHRONIC EFFECTS: DAMAGE TO BLOOD FORMING TISSUE

TARGET ORGANS

BLOOD, CENTRAL NERVOUS SYSTEM, EYES, SKIN, BONE MARROW, RESPIRATORY SYSTEM, LUNGS

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

ONE IDENTIFIED

PRIMARY ROUTES OF ENTRY

INGESTION, INHALATION, EYE CONTACT, SKIN CONTACT, ABSORPTION

CONTINUED ON PAGE: 5

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

B0792 -06

BENZENE

PAGE: 5

EFFECTIVE: 05/01/89

ISSUED: 03/21/91

SECTION V - HEALTH HAZARD DATA (CONTINUED)

EMERGENCY AND FIRST AID PROCEDURES

INGESTION: CALL A PHYSICIAN. IF SWALLOWED, DO NOT INDUCE VOMITING.

INHALATION: IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.

SKIN CONTACT: IN CASE OF CONTACT, IMMEDIATELY FLUSH SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

EYE CONTACT: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

SARA/TITLE III HAZARD CATEGORIES AND LISTS

ACUTE: YES CHRONIC: YES FLAMMABILITY: YES PRESSURE: NO REACTIVITY: NO

EXTREMELY HAZARDOUS SUBSTANCE: NO

CERCLA HAZARDOUS SUBSTANCE: YES CONTAINS BENZENE (RQ - 1000 LBS)

SARA 313 TOXIC CHEMICALS: YES CONTAINS BENZENE

GENERIC CLASS: C01

TSCA INVENTORY: YES

STATE LISTS: FOR PRODUCTS SOLD IN THE STATE OF CALIFORNIA, THE STATE REQUIRES THAT WE PROVIDE TO USERS AND THEIR EMPLOYEES THE FOLLOWING MESSAGE: WARNING: THIS PRODUCT IS A CHEMICAL KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

SECTION VI - REACTIVITY DATA

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

INCOMPATIBLES: STRONG OXIDIZING AGENTS. SULFURIC ACID. NITRIC ACID

DECOMPOSITION PRODUCTS: CARBON MONOXIDE, CARBON DIOXIDE

CONTINUED ON PAGE: 6

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
MATERIAL SAFETY DATA SHEET
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

BENZENE

PAGE: 6
ISSUED: 03/21/91

SECTION VII - SPILL & DISPOSAL PROCEDURES

ST. TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. SHUT OFF IGNITION SOURCES; NO FLARES, SMOKING OR FLAMES IN AREA. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE INTO CONTAINER FOR LATER DISPOSAL. FLUSH AREA WITH WATER.

J. T. BAKER SOLUSORB(R) SOLVENT ADSORBENT IS RECOMMENDED FOR SPILLS OF THIS PRODUCT.

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: U019 (TOXIC WASTE)

SECTION VIII - INDUSTRIAL PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RE RATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS ABOVE 10 PPM, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE SUIT, POLYVINYL ALCOHOL GLOVES ARE RECOMMENDED.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA* STORAGE COLOR CODE: RED STRIPE (STORE SEPARATELY)

STORAGE REQUIREMENTS

KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY, WELL-VENTILATED, FLAMMABLE LIQUID STORAGE AREA.

SPECIAL PRECAUTIONS

BOND AND GROUND CONTAINERS WHEN TRANSFERRING LIQUID.

CONTINUED ON PAGE: 7

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC * (800) 424-9300 -- NATIONAL RESPONSE CENTER * (800) 424-8802

BO -06
EFFECTIVE: 05/01/89

BENZENE

PAGE: 7
ISSUED: 03/21/91

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME: BENZENE (BENZOL)
HAZARD CLASS: FLAMMABLE LIQUID
UN/NA: UN1114 REPORTABLE QUANTITY: 1000 LBS.
LABELS: FLAMMABLE LIQUID
REGULATORY REFERENCES: 49CFR 172.101; 173.119

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME: BENZENE
HAZARD CLASS: 3.2
UN: UN1114 MARINE POLLUTANTS: NO
LABELS: FLAMMABLE LIQUID
REGULATORY REFERENCES: 49CFR 172.102; PART 176; IMO

I.M.O. PAGE: 3058
PACKAGING GROUP: II

AIR (I.C.A.O.)

PROPER SHIPPING NAME: BENZENE

HAZARD CLASS: 3.2

UN: UN1114

PACKAGING GROUP: II

LABELS: FLAMMABLE LIQUID

REGULATORY REFERENCES: 49CFR 172.101; 173.6; PART 175; ICAO/IATA

U.S. CUSTOMS HARMONIZATION NUMBER: 29022000001

N/A - NOT APPLICABLE OR NOT AVAILABLE

N/E - NOT ESTABLISHED

THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET MEETS THE REQUIREMENTS OF THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ACT AND REGULATIONS PROMULGATED THEREUNDER (29 CFR 1910.1200 ET. SEQ.) AND THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM. THIS DOCUMENT IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY A PERSON TRAINED IN, OR SUPERVISED BY A PERSON TRAINED IN, CHEMICAL HANDLING. THE USER IS RESPONSIBLE FOR DETERMINING THE PRECAUTIONS AND DANGERS OF THIS CHEMICAL FOR HIS OR HER PARTICULAR APPLICATION. DEPENDING ON USAGE, PROTECTIVE CLOTHING INCLUDING EYE AND FACE GUARDS AND RESPIRATORS MUST BE USED TO AVOID CONTACT WITH MATERIAL OR BREATHING CHEMICAL VAPORS/FUMES.

EXPOSURE TO THIS PRODUCT MAY HAVE SERIOUS ADVERSE HEALTH EFFECTS. THIS CHEMICAL MAY INTERACT WITH OTHER SUBSTANCES. SINCE THE POTENTIAL USES
CONTINUED ON PAGE: 8

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC * (800) 424-9300 -- NATIONAL RESPONSE CENTER * (800) 424-8802

B0792 -06

BENZENE

PAGE: 8

EFFECTIVE: 05/01/89

ISSUED: 03/21/91

ARE SO VARIED, BAKER CANNOT WARN OF ALL OF THE POTENTIAL DANGERS OF USE OR INTERACTION WITH OTHER CHEMICALS OR MATERIALS. BAKER WARRANTS THAT THE CHEMICAL MEETS THE SPECIFICATIONS SET FORTH ON THE LABEL. BAKER DISCLAIMS ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED WITH REGARD TO THE PRODUCT SUPPLIED HEREUNDER, ITS MERCHANTABILITY OR ITS FITNESS FOR A PARTICULAR PURPOSE.

THE USER SHOULD RECOGNIZE THAT THIS PRODUCT CAN CAUSE SEVERE INJURY AND EVEN DEATH, ESPECIALLY IF IMPROPERLY HANDLED OR THE KNOWN DANGERS OF USE ARE NOT HEEDED. READ ALL PRECAUTIONARY INFORMATION. AS NEW DOCUMENTED GENERAL SAFETY INFORMATION BECOMES AVAILABLE, BAKER WILL PERIODICALLY REVISE THIS MATERIAL SAFETY DATA SHEET.

NO CHEMTREC, CANUTEC, AND NATIONAL RESPONSE CENTER EMERGENCY TELEPHONE NUMBERS ARE TO BE USED ONLY IN THE EVENT OF CHEMICAL EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT INVOLVING CHEMICALS. ALL NON-EMERGENCY QUESTIONS SHOULD BE DIRECTED TO CUSTOMER SERVICE

(1-800-JTBAKER) FOR ASSISTANCE.

COPYRIGHT 1991 J.T.BAKER INC.

* TRADEMARKS OF J.T.BAKER INC.

APPROVED BY QUALITY ASSURANCE DEPARTMENT.

-- LAST PAGE --

OHS03536

MATERIAL SAFETY DATA SHEET

OCCUPATIONAL HEALTH SERVICES, INC.
11 WEST 42ND STREET, 12TH FLOOR
NEW YORK, NEW YORK 10036
1-800-445-MSDS (1-800-445-6737) OR
1-212-789-3535

FOR EMERGENCY SOURCE INFORMATION
CONTACT: 1-615-366-2000

SUBSTANCE IDENTIFICATION

CAS NUMBER: 85-68-7
RTECS NUMBER: TH9990000

SUBSTANCE: BUTYL BENZYL PHTHALATE

TRADE NAMES/SYNONYMS:

1,2-BENZENEDICARBOXYLIC ACID, BUTYL PHENYLMETHYL ESTER;
PHTHALIC ACID, BENZYL BUTYL ESTER; N-BUTYL BENZYL PHTHALATE;
BENZYL BUTYL PHTHALATE; BENZYL N-BUTYL PHTHALATE;
BUTYL PHENYLMETHYL 1,2-BENZENEDICARBOXYLATE; SANTICIZER 160; SICOL BBP;
SICOL 160; UNIMOLL BB; BBP; PALATINOL BB; C19H20O4; OHS03536

CHEMICAL FAMILY:
PHTHALATE

MOLECULAR FORMULA: C4-H9-O2-C-C6-H4-C-O2-C7-H7

MOLECULAR WEIGHT: 312.4

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=1 REACTIVITY=0 PERSISTENCE=1
NFPA RATINGS (SCALE 0-4): HEALTH=1 FIRE=1 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: BUTYL BENZYL PHTHALATE PERCENT: 100.0
CAS# 85-68-7

OTHER CONTAMINANTS: NONE.

EXPOSURE LIMITS:

NO OCCUPATIONAL EXPOSURE LIMITS ESTABLISHED BY OSHA, ACGIH, OR NIOSH.

BUTYL BENZYL PHTHALATE:

100 POUND CERCLA SECTION 103 REPORTABLE QUANTITY.

SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING.

PHYSICAL DATA

DESCRIPTION: CLEAR, COLORLESS, OILY LIQUID WITH A SLIGHT CHARACTERISTIC ODOR.

BOILING POINT: 698 F (370 C) MELTING POINT: <-31 F (<-35 C)

SPECIFIC GRAVITY: 1.113-1.121 VAPOR PRESSURE: NEGLIGIBLE @ 20 C
 SOLUBILITY IN WATER: 0.29 MG/100 ML VAPOR DENSITY: 10.8
 SOLVENT SOLUBILITY: MODERATELY SOLUBLE IN ETHANOL.

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
 SLIGHT FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

FLASH POINT: 390 F (198 C) LOWER EXPLOSIVE LIMIT: 1.2% @ 451 F (233 C)

AUTOIGNITION TEMP.: 451 F (233 C) FLAMMABILITY CLASS(OSHA): IIIB

FIREFIGHTING MEDIA:
 DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR REGULAR FOAM
 (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM
 (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FIREFIGHTING:
 MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT WITHOUT RISK. DO NOT SCATTER
 SPILLED MATERIAL WITH HIGH-PRESSURE WATER STREAMS. DIKE FIRE-CONTROL WATER FOR
 LATER DISPOSAL (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5, GUIDE
 PAGE 31).

USE AGENTS SUITABLE FOR TYPE OF SURROUNDING FIRE. AVOID BREATHING HAZARDOUS
 VAPORS, KEEP UPWIND.

TOXICITY

BUTYL BENZYL PHTHALATE:
 TOXICITY DATA: 2330 MG/KG ORAL-RAT LD50; 4170 MG/KG ORAL-MOUSE LD50;
 13750 MG/KG ORAL-GUINEA PIG LD50; 3160 MG/KG INTRAPERITONEAL-MOUSE LD50;
 REPRODUCTIVE EFFECTS DATA (RTECS); TUMORIGENIC DATA (RTECS).
 CARCINOGEN STATUS: HUMAN NO EVIDENCE, ANIMAL INADEQUATE EVIDENCE (IARC
 GROUP-3).
 ACUTE TOXICITY LEVEL: MODERATELY TOXIC BY INGESTION.
 TARGET EFFECTS: NO DATA AVAILABLE.

HEALTH EFFECTS AND FIRST AID

INHALATION:

BUTYL BENZYL PHTHALATE:

ACUTE EXPOSURE- MAY PRODUCE IRRITATING VAPORS AT ELEVATED TEMPERATURES.
 CHRONIC EXPOSURE- RATS WERE EXPOSED TO AIRBORNE AEROSOL CONCENTRATION OF
 360, 1000 AND 2100 MG/M3, 6 HOURS/DAY, 5 DAYS/WEEK FOR 4 WEEKS. INCREASED
 MORBIDITY AND ATROPHY OF THE SPLEEN AND REPRODUCTIVE ORGANS WERE OBSERVED.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:

BUTYL BENZYL PHTHALATE:

ACUTE EXPOSURE- MAY CAUSE IRRITATION. SKIN ABSORPTION MAY OCCUR.

CHRONIC EXPOSURE- A REPEATED PATCH TEST DONE ON 200 HUMAN VOLUNTEERS CAUSED NO POSITIVE REACTIONS. HOWEVER, MULTIPLE APPLICATION TO THE SKIN OF GUINEA PIGS HAVE CAUSED IRRITATION AND ALLERGIC SENSITIZATION.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:

BUTYL BENZYL PHTHALATE:

ACUTE EXPOSURE- MAY CAUSE IRRITATION.

CHRONIC EXPOSURE- NO DATA AVAILABLE.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:

BUTYL BENZYL PHTHALATE:

ACUTE EXPOSURE- THE LETHAL DOSE REPORTED IN RATS WAS 2330 MG/KG.

CHRONIC EXPOSURE- REPEATED ADMINISTRATION TO ANIMALS HAS PRODUCED DOSE-DEPENDENT ATROPHY OF THE PROSTATE, SEMINAL VESICLES, EPIDIDYMIS AND TESTES. OTHER REPRODUCTIVE EFFECTS HAVE ALSO BEEN REPORTED. ATROPHY OF THE THYMUS, SPLEEN, AND LIVER AND KIDNEY NECROSIS WERE ALSO REPORTED. AN INCREASED INCIDENCE OF MYCLOMONOCYTIC LEUKEMIA REPORTED IN ANIMALS MAY HAVE BEEN COMPOUND RELATED.

FIRST AID- TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY. IF VOMITING OCCURS, KEEP HEAD LOWER THAN HIPS TO PREVENT ASPIRATION.

ANTIDOTE:

NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

REACTIVITY:

STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:

BUTYL BENZYL PHTHALATE:

OXIDIZERS (STRONG): FIRE AND EXPLOSION HAZARD.
ALSO SEE ESTERS.

ESTERS:

NITRATES: POSSIBLE EXPLOSIVE REACTION.

DECOMPOSITION:

THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE TOXIC OXIDES OF CARBON.

POLYMERIZATION:

HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

****STORAGE****

STORE IN A COOL, DRY PLACE PROTECTED AGAINST LIGHT.

STORE IN A TIGHTLY CLOSED CONTAINER.

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

CONDITIONS TO AVOID

MAY BURN BUT DOES NOT IGNITE READILY. AVOID CONTACT WITH STRONG OXIDIZERS, EXCESSIVE HEAT, SPARKS, OR OPEN FLAME.

SPILL AND LEAK PROCEDURES

OCCUPATIONAL SPILL:

STOP LEAK IF YOU CAN DO IT WITHOUT RISK. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CLEAN, DRY CONTAINERS FOR LATER DISPOSAL. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY.

REPORTABLE QUANTITY (RQ): 100 POUNDS

THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

PROTECTIVE EQUIPMENT

VENTILATION:

PROVIDE LOCAL EXHAUST VENTILATION SYSTEM.

RESPIRATOR:

THE FOLLOWING RESPIRATORS ARE RECOMMENDED BASED ON INFORMATION FOUND IN THE PHYSICAL DATA, TOXICITY AND HEALTH EFFECTS SECTIONS. THEY ARE RANKED IN ORDER FROM MINIMUM TO MAXIMUM RESPIRATORY PROTECTION.

THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST BE BASED ON THE SPECIFIC OPERATION, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND MUST BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

ANY CHEMICAL CARTRIDGE RESPIRATOR WITH AN ORGANIC VAPOR CARTRIDGE(S)

ANY GAS MASK WITH ORGANIC VAPOR CANISTER (CHIN-STYLE OR FRONT- OR BACK-MOUNTED CANISTER).

ANY TYPE 'C' SUPPLIED-AIR RESPIRATOR OPERATED IN THE PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE OR CONTINUOUS-FLOW MODE.

ANY SELF-CONTAINED BREATHING APPARATUS.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

CLOTHING:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:

EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT EYE CONTACT WITH THIS SUBSTANCE.

EMERGENCY EYE WASH: WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

 AUTHORIZED BY- OCCUPATIONAL HEALTH SERVICES, INC.
 CREATION DATE: 11/26/91 REVISION DATE: 12/02/91

OHS03536
 85-68-7

BUTYL BENZYL PHTHALATE

Copyright 1991 Occupational Health Services, Inc. All Rights Reserved.
Licensed to: fluor daniel inc.
To make unlimited paper copies for internal distribution and use only.

-> d all 12

L23 ANSWER 12 OF 25

*
* MSDS Canadian Centre for Occupational Health and Safety *
*

AN 341959 MSDS-CCOHS

PRODUCT NAME(S): ***CHLOROFORM***

PRODUCT IDENTIFICATION: J.T. BAKER MSDS NUMBER: C2915
CAS NO.: 67-66-3
9182,9174,9183,9181,9180,9175,9257,E910,9186

MANUFACTURER(S): J T BAKER CHEMICAL CO

222 RED SCHOOL LANE
PHILLIPSBURG NEW JERSEY
U.S.A. 08865

Emergency Telephone: 908-859-2151
800-424-9300 (CHEMTREC)
800-424-8802 (NATIONAL RESPONSE CENTER)

DATE OF MSDS: 14 Sep 1989

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

C2915 -06
EFFECTIVE: 09/14/89

CHLOROFORM

PAGE: 1
ISSUED: 09/27/91

J.T.BAKER INC., 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: CHLOROFORM
COMMON SYNONYMS: TRICHLOROMETHANE; METHYL TRICHLORIDE; METHANE TRICHLORIDE
CHEMICAL FAMILY: CHLORINATED HYDROCARBONS
FORMULA: CHCL3
FORMULA WT.: 119.38
CAS NO.: 67-66-3

NIOSH/RTECS NO.: FS9100000
PRODUCT USE: LABORATORY REAGENT
PRODUCT CODES: 9182,9174,9183,9181,9180,9175,9257,E910,9186

PRECAUTIONARY LABELING

BAKER SAF-T-DATA* SYSTEM

HEALTH	-	3	SEVERE (CANCER CAUSING)
FLAMMABILITY	-	0	NONE
REACTIVITY	-	1	SLIGHT
CONTACT	-	2	MODERATE

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

U.S. PRECAUTIONARY LABELING

POISON DANGER

MAY BE FATAL IF SWALLOWED OR INHALED. EXCEPTIONAL HEALTH HAZARD: READ MATERIAL SAFETY DATA SHEET. CAUSES IRRITATION. HARMFUL IF ABSORBED THROUGH SKIN. NOTE: REPORTED AS CAUSING CANCER IN LABORATORY ANIMALS. EXERCISE DUE CARE. AVOID CONTACT WITH EYES, SKIN, CLOTHING. DO NOT BREATHE VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF SPILL, SOAK UP WITH SAND OR EARTH.

INTERNATIONAL LABELING

HARMFUL BY INHALATION. POSSIBLE RISKS OF IRREVERSIBLE EFFECTS.
KEEP OUT OF REACH OF CHILDREN. AVOID CONTACT WITH SKIN AND EYES.

CONTINUED ON PAGE: 2

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

C2915 -06
EFFECTIVE: 09/14/89

CHLOROFORM

PAGE: 2
ISSUED: 09/27/91

PRECAUTIONARY LABELING (CONTINUED)

SAF-T-DATA* STORAGE COLOR CODE: BLUE (HEALTH)

SECTION II - COMPONENTS

COMPONENT	CAS NO.	WEIGHT %	OSHA/PEL	ACGIH/TLV
CHLOROFORM	67-66-3	98-100	2 PPM	10 PPM

SECTION III - PHYSICAL DATA

BOILING POINT: 61 C (141 F) (AT 760 MM HG)	VAPOR PRESSURE (MMHG): 159 (20 C)
---	--------------------------------------

MELTING POINT: -64 C (-83 F) (AT 760 MM HG)	VAPOR DENSITY (AIR=1): 4.1
--	----------------------------

SPECIFIC GRAVITY: 1.48 (H2O=1)	EVAPORATION RATE: 0.09 (BUTYL ACETATE = 1)
-----------------------------------	---

SOLUBILITY(H2O): SLIGHT (0.1-1%)	% VOLATILES BY VOLUME: 100 (21 C)
----------------------------------	--------------------------------------

PH: N/A

ODOR THRESHOLD (P.P.M.): N/A

PHYSICAL STATE: LIQUID

COEFFICIENT WATER/OIL DISTRIBUTION: N/A

APPEARANCE & ODOR: CLEAR, COLORLESS LIQUID. PLEASANT ODOR.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP): N/A

NFPA 704M RATING: 2-0-0

AUTOIGNITION TEMPERATURE: N/A

FLAMMABLE LIMITS: UPPER - N/A

LOWER - N/A

CONTINUED ON PAGE: 3

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC * (800) 424-9300 -- NATIONAL RESPONSE CENTER * (800) 424-8802

C2915 -06
EFFECTIVE: 09/14/89

CHLOROFORM

PAGE: 3
ISSUED: 09/27/91

SECTION IV - FIRE AND EXPLOSION HAZARD DATA (CONTINUED)

FIRE EXTINGUISHING MEDIA

USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES

FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE & EXPLOSION HAZARDS

NONE IDENTIFIED.

TOXIC GASES PRODUCED

HYDROGEN CHLORIDE, CHLORINE, PHOSGENE

EXPLOSION DATA-SENSITIVITY TO MECHANICAL IMPACT

NONE IDENTIFIED.

EXPLOSION DATA-SENSITIVITY TO STATIC DISCHARGE

NONE IDENTIFIED.

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 49 MG/M3 (10 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): NOT ESTABLISHED

PERMISSIBLE EXPOSURE LIMIT (PEL): 9.78 MG/M3 (2 PPM)

TOXICITY OF COMPONENTS

ORAL RAT LD50 FOR CHLOROFORM	908	MG/KG
SUBCUTANEOUS MOUSE LD50 FOR CHLOROFORM	704	MG/KG
INTRAPERITONEAL MOUSE LD50 FOR CHLOROFORM	1	G/KG
INHALATION MOUSE LC50 FOR CHLOROFORM	28	G/M3
CARCINOGENICITY: NTP: YES IARC: YES Z LIST: NO OSHA REG: NO		

CARCINOGENICITY

THIS SUBSTANCE IS LISTED AS AN ACGIH ANTICIPATED HUMAN CARCINOGEN, A NTP ANTICIPATED HUMAN CARCINOGEN, AND AN IARC PROBABLE HUMAN CARCINOGEN (GROUPS 2A & 2B).

CONTINUED ON PAGE: 4

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

C2915 -06
EFFECTIVE: 09/14/89

CHLOROFORM

PAGE: 4
ISSUED: 09/27/91

SECTION V - HEALTH HAZARD DATA (CONTINUED)

REPRODUCTIVE EFFECTS

NONE IDENTIFIED.

EFFECTS OF OVEREXPOSURE

INHALATION: HEADACHE, NAUSEA, VOMITING, DIZZINESS, DROWSINESS,
IRRITATION OF UPPER RESPIRATORY TRACT, DRYNESS OF MOUTH
AND THROAT, UNCONSCIOUSNESS, AND MAY BE FATAL

SKIN CONTACT: IRRITATION, PROLONGED CONTACT MAY CAUSE DERMATITIS

EYE CONTACT: IRRITATION, MAY CAUSE TEMPORARY CORNEAL DAMAGE

SKIN ABSORPTION: RAPID ABSORPTION

INGESTION: NAUSEA, VOMITING, GASTROINTESTINAL IRRITATION, BURNS TO
MOUTH AND THROAT, AND MAY BE FATAL

CHRONIC EFFECTS: KIDNEY DAMAGE, LIVER DAMAGE

TARGET ORGANS

LIVER, KIDNEYS, HEART, EYES, SKIN

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

KIDNEY DISORDERS, LIVER DISORDERS, HEART DISORDERS, SKIN DISORDERS

PRIMARY ROUTES OF ENTRY

INHALATION, INGESTION, SKIN CONTACT, EYE CONTACT

EMERGENCY AND FIRST AID PROCEDURES

INGESTION: CALL A PHYSICIAN. IF SWALLOWED, IF CONSCIOUS, IMMEDIATELY INDUCE VOMITING.

INHALATION: IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.

SKIN CONTACT: IN CASE OF CONTACT, FLUSH SKIN WITH WATER.

EYE CONTACT: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

CONTINUED ON PAGE: 5

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

C2915 -06
EFFECTIVE: 09/14/89

CHLOROFORM

PAGE: 5
ISSUED: 09/27/91

SECTION V - HEALTH HAZARD DATA (CONTINUED)

SARA/TITLE III HAZARD CATEGORIES AND LISTS

ACUTE: YES CHRONIC: YES FLAMMABILITY: NO PRESSURE: NO REACTIVITY: NO

EXTREMELY HAZARDOUS SUBSTANCE: YES CONTAINS CHLOROFORM (RQ - 5,000 LBS, TPQ - 10,000 LBS)

CERCLA HAZARDOUS SUBSTANCE: YES CONTAINS CHLOROFORM (RQ - 5000 LBS)

SARA 313 TOXIC CHEMICALS: YES CONTAINS CHLOROFORM

GENERIC CLASS: C02

TSCA INVENTORY: YES

STATE LISTS: FOR PRODUCTS SOLD IN THE STATE OF CALIFORNIA, THE STATE REQUIRES THAT WE PROVIDE TO USERS AND THEIR EMPLOYEES THE FOLLOWING MESSAGE: WARNING: THIS PRODUCT IS A CHEMICAL KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

SECTION VI - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, FLAME, OTHER SOURCES OF IGNITION, LIGHT, AIR, MOISTURE

INCOMPATIBLES: STRONG BASES, ALKALI METALS, ALUMINUM, MAGNESIUM,

STRONG OXIDIZING AGENTS

DECOMPOSITION PRODUCTS: CHLORINE, HYDROGEN CHLORIDE, PHOSGENE

SECTION VII - SPILL & DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE INTO CONTAINER FOR LATER DISPOSAL. FLUSH SPILL AREA WITH WATER.

J. T. BAKER SOLUSORB(R) SOLVENT ADSORBENT IS RECOMMENDED FOR SPILLS OF THIS PRODUCT.

CONTINUED ON PAGE: 6

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

C2915 -06
EFFECTIVE: 09/14/89

CHLOROFORM

PAGE: 6
ISSUED: 09/27/91

SECTION VII - SPILL & DISPOSAL PROCEDURES (CONTINUED)

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: U044 (TOXIC WASTE)

SECTION VIII - INDUSTRIAL PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS ABOVE 10 PPM, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE SUIT, POLYVINYL ALCOHOL GLOVES ARE RECOMMENDED.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA* STORAGE COLOR CODE: BLUE (HEALTH)

STORAGE REQUIREMENTS

KEEP CONTAINER TIGHTLY CLOSED. STORE IN SECURE POISON AREA. ISOLATE FROM INCOMPATIBLE MATERIALS.

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME: CHLOROFORM (AIR AND WATER ONLY)

HAZARD CLASS: ORM-A

UN/NA: UN1888 REPORTABLE QUANTITY: 5000 LBS.

LABELS: NONE

REGULATORY REFERENCES: 49CFR 172.101; 173.500; 173.510

CONTINUED ON PAGE: 7

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

M A T E R I A L S A F E T Y D A T A S H E E T

24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151

CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

C2915 -06

CHLOROFORM

PAGE: 7

EFFECTIVE: 09/14/89

ISSUED: 09/27/91

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION (CONTINUED)

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME: CHLOROFORM

HAZARD CLASS: 6.1

UN: UN1888 MARINE POLLUTANTS: YES

LABELS: POISON

REGULATORY REFERENCES: 49CFR 172.102; PART 176; IMO

I.M.O. PAGE: 6103

PACKAGING GROUP: II

AIR (I.C.A.O.)

PROPER SHIPPING NAME: CHLOROFORM

HAZARD CLASS: 6.1

UN: UN1888

PACKAGING GROUP: II

LABELS: POISON

REGULATORY REFERENCES: 49CFR 172.101; 173.6; PART 175; ICAO/IATA

U.S. CUSTOMS HARMONIZATION NUMBER: 29031300009

N/A - NOT APPLICABLE OR NOT AVAILABLE

N/E - NOT ESTABLISHED

THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET MEETS THE REQUIREMENTS OF THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ACT AND REGULATIONS PROMULGATED THEREUNDER (29 CFR 1910.1200 ET. SEQ.) AND THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM. THIS DOCUMENT IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY A PERSON TRAINED IN, OR SUPERVISED BY A PERSON TRAINED IN, CHEMICAL HANDLING. THE USER IS RESPONSIBLE FOR DETERMINING THE PRECAUTIONS AND DANGERS OF THIS CHEMICAL FOR HIS OR HER PARTICULAR APPLICATION. DEPENDING ON USAGE, PROTECTIVE CLOTHING INCLUDING EYE AND FACE GUARDS AND RESPIRATORS MUST BE USED TO AVOID CONTACT WITH MATERIAL OR BREATHING CHEMICAL VAPORS/FUMES.

EXPOSURE TO THIS PRODUCT MAY HAVE SERIOUS ADVERSE HEALTH EFFECTS. THIS CHEMICAL MAY INTERACT WITH OTHER SUBSTANCES. SINCE THE POTENTIAL USES ARE SO VARIED, BAKER CANNOT WARN OF ALL OF THE POTENTIAL DANGERS OF USE OR INTERACTION WITH OTHER CHEMICALS OR MATERIALS. BAKER WARRANTS THAT THE CHEMICAL MEETS THE SPECIFICATIONS SET FORTH ON THE LABEL. BAKER DISCLAIMS ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED WITH REGARD TO THE PRODUCT SUPPLIED HEREUNDER, ITS MERCHANTABILITY OR ITS FITNESS FOR A PARTICULAR PURPOSE.

THE USER SHOULD RECOGNIZE THAT THIS PRODUCT CAN CAUSE SEVERE INJURY AND
CONTINUED ON PAGE: 8

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

C2915 -06
EFFECTIVE: 09/14/89

CHLOROFORM

PAGE: 8
ISSUED: 09/27/91

EVEN DEATH, ESPECIALLY IF IMPROPERLY HANDLED OR THE KNOWN DANGERS OF USE ARE NOT HEEDED. READ ALL PRECAUTIONARY INFORMATION. AS NEW DOCUMENTED GENERAL SAFETY INFORMATION BECOMES AVAILABLE, BAKER WILL PERIODICALLY REVISE THIS MATERIAL SAFETY DATA SHEET.

NOTE: CHEMTREC, CANUTEC, AND NATIONAL RESPONSE CENTER EMERGENCY TELEPHONE NUMBERS ARE TO BE USED ONLY IN THE EVENT OF CHEMICAL EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT INVOLVING CHEMICALS. ALL NON-EMERGENCY QUESTIONS SHOULD BE DIRECTED TO CUSTOMER SERVICE (1-800-JTBAKER) FOR ASSISTANCE.

COPYRIGHT 1991 J.T.BAKER INC.
* TRADEMARKS OF J.T.BAKER INC.

—
APPROVED BY QUALITY ASSURANCE DEPARTMENT.

-- LAST PAGE --

-> 4 all 3

L8 ANSWER 3 OF 13

*
* MSDS Canadian Centre for Occupational Health and Safety *
*

AN 301314 MSDS-CCOHS

PRODUCT NAME(S): ***1,1-DICHLOROETHANE***

PRODUCT IDENTIFICATION: Dow Product Code: 20449
Dow MSDS Number: 002733

MANUFACTURER(S): DOW CHEMICAL CANADA INC

SARNIA ONTARIO
CANADA N7T 7K7

Emergency Telephone: 519-339-3711 SARNIA
403-998-8282 FORT SASKATCHEWAN

For French translation of this data sheet, please contact Dow Chemical
Canada Inc directly.

DATE OF MSDS: 13 Jun 1990

M A T E R I A L S A F E T Y D A T A S H E E T

Dow Chemical Canada Inc. Sarnia, Ont. N7T 7K7 Phone: 519-339-3711
Product Code: 20449 Page: 1
Product Name:
1,1-DICHLOROETHANE

Effective Date: 06/13/90 Date Printed: 05/08/91 MSDS:002733

1. INGREDIENTS: (% w/w, unless otherwise noted)

1,1-Dichloroethane	CAS# 000075-34-3	100%
--------------------	------------------	------

2. PHYSICAL DATA:

BOILING POINT: 135F, 57C
VAP PRESS: 183.0 mmHg @ 20C
VAP DENSITY: 3.41
SOL. IN WATER: 0.55 g/100g @ 20C
SP. GRAVITY: 1.165 @ 25/25C
APPEARANCE: Colorless liquid.
ODOR: Chloroform like odor, pungent.

3. FIRE AND EXPLOSION HAZARD DATA:

FLASH POINT: -17C (2F)
METHOD USED: TCC

FLAMMABLE LIMITS

LFL: 5.4% Vol.

UFL: 11.4% Vol.

EXTINGUISHING MEDIA: Foam, CO2, dry chemical. Water fog for large fires.

FIRE & EXPLOSION HAZARDS: Vapor is heavier than air and may travel considerable distance to a source of ignition and flash back. Water can be used as a blanket to extinguish fire. Keep vapors away from possible ignition sources.

FIRE-FIGHTING EQUIPMENT: Wear positive pressure self-contained breathing apparatus.

(Continued on page 2)

(R) Indicates a trademark of The Dow Chemical Company

Dow Chemical Canada Inc. Sarnia, Ont. N7T 7K7 Phone: 519-339-3711

Product Code: 20449

Page: 2

Product Name:

1,1-DICHLOROETHANE

Effective Date: 06/13/90 Date Printed: 05/08/91

MSDS:002733

4. REACTIVITY DATA:

STABILITY: (CONDITIONS TO AVOID) Avoid open flames, welding arcs or other high temperature sources which induce thermal decomposition.

INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID) Avoid alkali, oxidizing material, amines. Avoid contact with aluminum and its alloys.

HAZARDOUS DECOMPOSITION PRODUCTS: Hydrogen chloride. Incomplete combustion can produce small amounts of phosgene and carbon monoxide.

HAZARDOUS POLYMERIZATION: Will not occur.

5. ENVIRONMENTAL AND DISPOSAL INFORMATION:

ACTION TO TAKE FOR SPILLS/LEAKS: Eliminate all sources of ignition. Small spills: Mop up, wipe up or soak up immediately. Remove to out of doors. Large spills: Contain liquid; transfer to closed metal containers.

DISPOSAL METHOD: Send solvent to a reclaimer or incinerate in

equipment equipped with an HCl scrubber according to local, state, and federal regulations. Contact The Dow Chemical Company for additional help.

6. HEALTH HAZARD DATA:

EYE: May cause moderate eye irritation and very slight transient (temporary) corneal injury.

SKIN CONTACT: Prolonged or repeated exposure may cause skin irritation, even a burn. May cause drying or flaking of skin. May cause more severe response if confined to skin.

SKIN ABSORPTION: A single prolonged exposure is not likely to result in the material being absorbed through skin in harmful

(Continued on page 3)

(R) Indicates a trademark of The Dow Chemical Company

Dow Chemical Canada Inc. Sarnia, Ont. N7T 7K7 Phone: 519-339-3711

Product Code: 20449

Page: 3

Product Name:

1,1-DICHLOROETHANE

Effective Date: 06/13/90 Date Printed: 05/08/91

MSDS:002733

6. HEALTH HAZARD DATA: (CONTINUED)

amounts. The dermal LD50 has not been determined.

INGESTION: Single dose oral toxicity is low. Single dose oral LD50 for rats is 14100 mg/kg. If aspirated (liquid enters the lung), may be rapidly absorbed through the lungs and result in injury to other body systems.

INHALATION: Excessive vapor concentrations are attainable and a single exposure may cause death. In confined or poorly ventilated areas, vapors can readily accumulate and can cause unconsciousness and death. Excessive exposure may cause lung injury. Signs and symptoms of excessive exposure may be anesthetic or narcotic effects.

SYSTEMIC & OTHER EFFECTS: Excessive exposure may cause kidney injury; liver injury not likely. Available data are inadequate to evaluate carcinogenicity. Birth defects are unlikely. Even exposures having an adverse effect on the mother should have no effect on the fetus.

7. FIRST AID:

EYES: Irrigate with flowing water immediately and continuously for 15 minutes. Consult medical personnel.

SKIN: Wash off in flowing water or shower. Wash contaminated clothing before reuse.

INGESTION: Do not induce vomiting. Call a physician and/or transport to emergency facility immediately.

INHALATION: Remove to fresh air. If not breathing, give mouth-to-mouth resuscitation. If breathing is difficult, give oxygen. Call a physician.

NOTE TO PHYSICIAN: Because rapid absorption may occur through lungs if aspirated and cause systemic effects, the decision of whether to induce vomiting or not should be made by a physician.

Continued on page 4)

R) Indicates a trademark of The Dow Chemical Company

Dow Chemical Canada Inc. Sarnia, Ont. N7T 7K7 Phone: 519-339-3711

Product Code: 20449

Page: 4

Product Name:

1,1-DICHLOROETHANE

Effective Date: 06/13/90 Date Printed: 05/08/91

MSDS:002733

FIRST AID: (CONTINUED)

If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. If burn is present, treat as any thermal burn, after decontamination. Exposure may increase "myocardial irritability." Do not administer sympathomimetic drugs unless absolutely necessary. No specific antidote. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

HANDLING PRECAUTIONS:

EXPOSURE GUIDELINE: ACGIH TLV is 200 ppm, STEL 250 ppm. OSHA PEL is 100 ppm.

VENTILATION: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines. Lethal concentrations may exist in areas with poor ventilation.

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required for certain operations, use an approved air-purifying respirator. For emergency and other conditions where the exposure guideline may be greatly exceeded, use an approved positive pressure self-contained breathing apparatus. In confined or poorly ventilated areas, use an approved positive pressure self-contained breathing apparatus. The following should be effective types of air-purifying respirators: organic vapor, organic vapor/acid gas.

SKIN PROTECTION: Use protective clothing impervious to this material. Selection of specific items such as gloves, boots,

OHS06740

MATERIAL SAFETY DATA SHEET

OCCUPATIONAL HEALTH SERVICES, INC.
11 WEST 42ND STREET, 12TH FLOOR
NEW YORK, NEW YORK 10036
1-800-445-MSDS (1-800-445-6737) OR
1-212-789-3535

FOR EMERGENCY SOURCE INFORMATION
CONTACT: 1-615-366-2000

SUBSTANCE IDENTIFICATION

CAS NUMBER: 84-74-2
RTECS NUMBER: TI0875000

SUBSTANCE: DIBUTYL PHTHALATE

TRADE NAMES/SYNONYMS:

PHTHALIC ACID, DIBUTYL ESTER; DI-N-BUTYL PHTHALATE; BUTYL PHTHALATE;
O-BENZENEDICARBOXYLIC ACID, DIBUTYL ESTER;
1,2-BENZENEDICARBOXYLIC ACID, DIBUTYL ESTER;
DIBUTYL-1,2-BENZENE DICARBOXYLATE; DIBUTYL PHTHALATE ESTER;
BENZENE-O-DICARBOXYLIC ACID, DI-N-BUTYL ESTER; DBP; CELLUFLEX DBP; ELAOL;
POLYCIZER DBP; PX 104; STAFLEX DBP; BIS-N-BUTYL PHTHALATE;
N-BUTYL PHTHALATE; DIBUTYL O-PHTHALATE; STCC 4962110; RCRA U029; C16H22O4;
OHS06740

CHEMICAL FAMILY:
ESTER, CARBOXYLIC, AROMATIC

MOLECULAR FORMULA: $C_6H_4-(C-O_2-C_4H_9)_2$

MOLECULAR WEIGHT: 278.35

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=1 REACTIVITY=0 PERSISTENCE=1
NFPA RATINGS (SCALE 0-4): HEALTH=0 FIRE=1 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: DIBUTYL PHTHALATE
CAS# 84-74-2

PERCENT: 100.0

OTHER CONTAMINANTS: NONE.

EXPOSURE LIMITS:

DIBUTYL PHTHALATE:

5 MG/M3 OSHA TWA
5 MG/M3 ACGIH TWA
5 MG/M3 NIOSH RECOMMENDED TWA

MEASUREMENT METHOD: PARTICULATE FILTER; CARBON DISULFIDE; GAS CHROMATOGRAPHY
WITH FLAME IONIZATION DETECTION; (NIOSH VOL. III # 5020).

10 POUNDS CERCLA SECTION 103 REPORTABLE QUANTITY
SUBJECT TO SARA 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING

PHYSICAL DATA

DESCRIPTION: COLORLESS TO FAINT-YELLOW OILY LIQUID WITH A WEAK AROMATIC ODOR AND A STRONG BITTER TASTE. BOILING POINT: 644 F (340 C)
MELTING POINT: -31 F (-35 C) SPECIFIC GRAVITY: 1.047
VISCOSITY: 0.203 PS @ 20 C VOLATILITY: 0%
VAPOR PRESSURE: <0.01 MMHG @ 20 C EVAPORATION RATE: (BUTYL ACETATE=1) 0
SOLUBILITY IN WATER: 4500 PPM @ 25 C ODOR THRESHOLD: 5 MG/L
VAPOR DENSITY: 9.58
SOLVENT SOLUBILITY: SOLUBLE IN ACETONE, ALCOHOL, ETHER, BENZENE, AND OTHER COMMON ORGANIC SOLVENTS.

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
SLIGHT FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.
DUE TO LOW ELECTROCONDUCTIVITY OF THE SUBSTANCE, FLOW OR AGITATION MAY GENERATE ELECTROSTATIC CHARGES RESULTING IN SPARKS WITH POSSIBLE IGNITION.
FLASH POINT: 315 F (157 C) (CC) UPPER EXPLOSIVE LIMIT: 2.5%
LOWER EXPLOSIVE LIMIT: 0.5% @ 235 C AUTOIGNITION TEMP.: 757 F (402 C)
FLAMMABILITY CLASS(OSHA): IIIB
FIREFIGHTING MEDIA:
DRY CHEMICAL, WATER SPRAY OR REGULAR FOAM
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).
FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).
FIREFIGHTING:
MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT WITHOUT RISK. FIGHT FIRE FROM MAXIMUM DISTANCE. STAY AWAY FROM ENDS OF TANKS. DIKE FIRE-CONTROL WATER FOR LATER DISPOSAL; DO NOT SCATTER THE MATERIAL (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5, GUIDE PAGE 55).
EXTINGUISH ONLY IF FLOW CAN BE STOPPED. EXTINGUISH USING AGENT INDICATED. USE FLOODING AMOUNTS OF WATER AS A FOG. COOL CONTAINERS WITH FLOODING AMOUNTS OF WATER FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING POISONOUS VAPORS, KEEP UPWIND. CONSIDER EVACUATION OF DOWNWIND AREA IF MATERIAL IS LEAKING.

WATER OR FOAM MAY CAUSE FROTHING (NFPA 325M, FIRE HAZARD PROPERTIES OF FLAMMABLE LIQUIDS, GASES, AND VOLATILE SOLIDS, 1991)

TOXICITY

DIBUTYL PHTHALATE (N-BUTYL PHTHALATE):

TOXICITY DATA: 4250 MG/M3 INHALATION-RAT LC50; 25 GM/M3/2 HOURS

INHALATION-MOUSE LC50; 6 GM/KG SKIN-RAT LDLO; >20 GM/KG SKIN-RABBIT LD50; 140 MG/KG ORAL-HUMAN TDLO; 8 GM/KG ORAL-RAT LD50; 5289 MG/KG ORAL-MOUSE LD50; 10 GM/KG ORAL-GUINEA PIG LD50; 20,800 MG/KG SUBCUTANEOUS-MOUSE LD50; 720 MG/KG INTRAVENOUS-MOUSE LD50; 3050 MG/KG INTRAPERITONEAL-RAT LD50; 3570 MG/KG INTRAPERITONEAL-MOUSE LD50; >8 GM/KG INTRAMUSCULAR-RAT LD50; MUTAGENIC DATA (RTECS); REPRODUCTIVE EFFECTS DATA (RTECS).

CARCINOGEN STATUS: NONE.

LOCAL EFFECTS: IRRITANT- INHALATION, EYE.

ACUTE TOXICITY LEVEL: TOXIC BY INHALATION; SLIGHTLY TOXIC BY INGESTION, RELATIVELY NON-TOXIC BY DERMAL ABSORPTION.

TARGET EFFECTS: POISONING MAY AFFECT THE NERVOUS SYSTEM AND THE KIDNEYS.

AT INCREASED RISK: PERSONS WITH KIDNEY DAMAGE.

HEALTH EFFECTS AND FIRST AID

INHALATION:

DIBUTYL PHTHALATE (N-BUTYL PHTHALATE):

9300 MG/M3 IMMEDIATELY DANGEROUS TO LIFE OR HEALTH.

IRRITANT/TOXIC.

ACUTE EXPOSURE- INHALATION OF SPRAY OR MIST MAY CAUSE IRRITATION OF THE MUCOUS MEMBRANES, SORE THROAT, COUGHING, AND DIZZINESS. VAPORS FROM HOT MATERIAL MAY PRODUCE HEADACHE, DROWSINESS, AND CONVULSIONS.

ANIMAL STUDIES INDICATE 250 MG/M3 CAUSED IRRITATION OF THE RESPIRATORY SYSTEM, WHILE 25,000 MG/M3 CAUSED LABORED BREATHING, ATAXIA, PARESIS, CONVULSIONS, AND DEATH FROM PARALYSIS OF THE RESPIRATORY SYSTEM.

CHRONIC EXPOSURE- WORKERS IN AN ARTIFICIAL LEATHER INDUSTRY IN WHICH THE DURATION OF EXPOSURE RANGED FROM .5 YEAR TO 19 YEARS AND IN WHICH SEVERAL PHTHALATE PLASTICIZERS WERE USED, (DIBUTYL PHTHALATE WAS COMMONLY USED), SHOWED SIGNS OF POLYNEURITIS WITH PAIN, NUMBNESS, AND SPASMS IN THE UPPER AND LOWER EXTREMITIES.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:

DIBUTYL PHTHALATE (N-BUTYL PHTHALATE):

ACUTE EXPOSURE- MAY CAUSE IRRITATION WITH REDNESS AND PAIN.

CHRONIC EXPOSURE- NO DATA AVAILABLE.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL

ATTENTION IMMEDIATELY.

EYE CONTACT:

DIBUTYL PHTHALATE (N-BUTYL PHTHALATE):
IRRITANT.

ACUTE EXPOSURE- A SPLASH IN THE EYE MAY CAUSE AN IMMEDIATE SEVERE STINGING PAIN WITH PROFUSE TEARING.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE WITH IRRITANTS MAY CAUSE CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:

DIBUTYL PHTHALATE (N-BUTYL PHTHALATE):

ACUTE EXPOSURE- MAY CAUSE GASTROINTESTINAL IRRITATION WITH ABDOMINAL PAIN, NAUSEA, VOMITING AND DIZZINESS. A CHEMICAL WORKER WHO ACCIDENTALLY INGESTED 10 GRAMS EXPERIENCED NAUSEA, VOMITING AND DIZZINESS FOLLOWED LATER BY HEADACHE, PAIN AND IRRITATION IN THE EYES, LACRIMATION, PHOTOPHOBIA AND CONJUNCTIVITIS. DELAYED RENAL INVOLVEMENT OCCURRED WITH COMPLETE RECOVERY IN 2 WEEKS. COMA MAY ALSO OCCUR.

CHRONIC EXPOSURE- DAILY ADMINISTRATION TO RATS OF 2 GM/KG PRODUCED TESTICULAR ATROPHY AND LOSS OF TESTICULAR ZINC. OTHER REPRODUCTIVE EFFECTS HAVE ALSO BEEN REPORTED IN ANIMALS.

FIRST AID- IF THE PERSON IS CONSCIOUS AND NOT CONVULSING, REMOVE BY GASTRIC LAVAGE AND FOLLOW WITH A CATHARTIC (DREISBACH, HANDBOOK OF POISONING, 12TH ED.). TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GASTRIC LAVAGE SHOULD BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL. GET MEDICAL ATTENTION IMMEDIATELY.

ANTIDOTE:

NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

REACTIVITY:

STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:

DIBUTYL PHTHALATE (N-BUTYL PHTHALATE):

ACIDS (STRONG): POSSIBLE FIRE AND EXPLOSION HAZARD.

ALKALIES (STRONG): POSSIBLE FIRE AND EXPLOSION HAZARD.

CHLORINE: POSSIBLE EXPLOSION.

NITRATES: POSSIBLE FIRE AND EXPLOSION HAZARD.

OXIDIZERS (STRONG): POSSIBLE FIRE AND EXPLOSION HAZARD.

REDUCING MATERIALS: INCOMPATIBLE.

DECOMPOSITION:

THERMAL DECOMPOSITION MAY RELEASE ACRID SMOKE AND IRRITATING FUMES.

POLYMERIZATION:

HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL

TEMPERATURES AND PRESSURES.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

****STORAGE****

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

KEEP IN A TIGHTLY CLOSED CONTAINER. STORE IN A COOL, DRY, VENTILATED AREA.

****DISPOSAL****

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40 CFR 262. EPA HAZARDOUS WASTE NUMBER U069.

CONDITIONS TO AVOID

MAY BURN BUT DOES NOT IGNITE READILY. CONTAINERS MAY EXPLODE IN HEAT OF FIRE.

SPILL AND LEAK PROCEDURES

SOIL SPILL:

DIG HOLDING AREA SUCH AS LAGOON, POND OR PIT FOR CONTAINMENT.

DIKE FLOW OF SPILLED MATERIAL USING SOIL OR SANDBAGS OR FOAMED BARRIERS SUCH AS POLYURETHANE OR CONCRETE.

USE CEMENT POWDER OR FLY ASH TO ABSORB LIQUID MASS.

AIR SPILL:

KNOCK DOWN VAPORS WITH WATER SPRAY. KEEP UPWIND.

WATER SPILL:

LIMIT SPILL MOTION AND DISPERSION WITH NATURAL BARRIERS OR OIL SPILL CONTROL BOOMS.

APPLY DETERGENTS, SOAPS, ALCOHOLS OR ANOTHER SURFACE ACTIVE AGENT.

APPLY UNIVERSAL GELLING AGENT TO IMMOBILIZE TRAPPED SPILL AND INCREASE EFFICIENCY OF REMOVAL.

USE SUCTION HOSES TO REMOVE TRAPPED SPILL MATERIAL.

USE ACTIVATED CARBON TO ABSORB SPILLED SUBSTANCE THAT IS DISSOLVED.

USE MECHANICAL DREDGES OR LIFTS TO EXTRACT IMMOBILIZED MASSES OF POLLUTION AND PRECIPITATES.

OCCUPATIONAL SPILL:

DO NOT TOUCH SPILLED MATERIAL. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR SMALL DRY SPILLS, WITH A CLEAN SHOVEL PLACE MATERIAL INTO CLEAN, DRY CONTAINERS AND COVER. MOVE CONTAINERS FROM SPILL AREA. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY. VENTILATE CLOSED SPACES BEFORE ENTERING.

REPORTABLE QUANTITY (RQ): 10 POUNDS

THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

PROTECTIVE EQUIPMENT

VENTILATION:

PROVIDE LOCAL EXHAUST OR PROCESS ENCLOSURE VENTILATION TO MEET PUBLISHED EXPOSURE LIMITS.

RESPIRATOR:

THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO CHEMICAL HAZARDS; NIOSH CRITERIA DOCUMENTS OR BY THE U.S. DEPARTMENT OF LABOR, 29 CFR 1910 SUBPART Z.

THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

DIBUTYL PHTHALATE:

50 MG/M3- ANY DUST AND MIST RESPIRATOR WITH A FULL FACEPIECE.

125 MG/M3- ANY POWERED AIR-PURIFYING RESPIRATOR WITH A DUST AND MIST FILTER.
ANY SUPPLIED-AIR RESPIRATOR OPERATED IN A CONTINUOUS FLOW MODE.

250 MG/M3- ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER.
ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.
ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE.

9300 MG/M3- ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE AND OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

ESCAPE- ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER.

ANY APPROPRIATE ESCAPE-TYPE, SELF-CONTAINED BREATHING APPARATUS
FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS
OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A
PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE IN COMBINATION WITH AN
AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND
OR OTHER POSITIVE-PRESSURE MODE.

CLOTHING:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT
TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS
SUBSTANCE.

EYE PROTECTION:

EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT
EYE CONTACT WITH THIS SUBSTANCE.

EMERGENCY EYE WASH: WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY
BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH
FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED BY- OCCUPATIONAL HEALTH SERVICES, INC.
CREATION DATE: 12/07/84 REVISION DATE: 12/17/91

OHS06740

84-74-2

DIBUTYL PHTHALATE

Copyright 1991 Occupational Health Services, Inc. All Rights Reserved.
Licensed to: fluor daniel inc.
To make unlimited paper copies for internal distribution and use only.

-> d all 6

L5 ANSWER 6 OF 10

*
* MSDS Canadian Centre for Occupational Health and Safety *
*

AN 342071 MSDS-CCOHS

PRODUCT NAME(S): ***1,2-DICHLOROETHANE***

PRODUCT IDENTIFICATION: J.T. BAKER MSDS NUMBER: D2440
CAS NO.: 107-06-2
H076,9302

MANUFACTURER(S): J T BAKER CHEMICAL CO

222 RED SCHOOL LANE
PHILLIPSBURG NEW JERSEY
U.S.A. 08865

Emergency Telephone: 908-859-2151
800-424-9300 (CHEMTREC)
800-424-8802 (NATIONAL RESPONSE CENTER)

DATE OF MSDS: 14 Sep 1989

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

D2440 -08 1,2-DICHLO PAGE: 1
EFFECTIVE: 09/14/89 ISSUED: 09/27/91

J.T.BAKER INC., 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: 1,2-DICHLOROETHANE
COMMON SYNONYMS: ETHYLENE DICHLORIDE; 1,2-BICHLOROETHANE; ETHYLENE CHLORIDE
CHEMICAL FAMILY: CHLORINATED HYDROCARBONS
FORMULA: CLCH2CH2CL
FORMULA WT.: 98.96
CAS NO.: 107-06-2

NIOSH/RTECS NO.: K10525000
PRODUCT USE: LABORATORY REAGENT
PRODUCT CODES: H076,9302

PRECAUTIONARY LABELING

BAKER SAF-T-DATA* SYSTEM

HEALTH	-	3	SEVERE (CANCER CAUSING)
FLAMMABILITY	-	3	SEVERE (FLAMMABLE)
REACTIVITY	-	1	SLIGHT
CONTACT	-	2	MODERATE

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B
EXTINGUISHER

U.S. PRECAUTIONARY LABELING

WARNING

FLAMMABLE. CAUSES IRRITATION. HARMFUL IF SWALLOWED OR INHALED. NOTE: REPORTED
AS CAUSING CANCER IN LABORATORY ANIMALS. EXERCISE DUE CARE.
KEEP AWAY FROM HEAT, SPARKS, FLAME. AVOID CONTACT WITH EYES, SKIN, CLOTHING.
AVOID BREATHING VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE
VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF FIRE, USE ALCOHOL
FOAM, DRY CHEMICAL, CARBON DIOXIDE - WATER MAY BE INEFFECTIVE. FLUSH SPILL
AREA WITH WATER SPRAY.

CONTINUED ON PAGE: 2

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

D2440 -08
EFFECTIVE: 09/14/89

1,2-DICHLOROETHANE

PAGE: 2
ISSUED: 09/27/91

PRECAUTIONARY LABELING (CONTINUED)

INTERNATIONAL LABELING

HIGHLY FLAMMABLE. HARMFUL BY INHALATION. POSSIBLE RISKS OF IRREVERSIBLE EFFECTS.
KEEP CONTAINER TIGHTLY CLOSED. KEEP AWAY FROM SOURCES OF IGNITION - NO SMOKING. DO NOT EMPTY INTO DRAINS. TAKE PRECAUTIONARY MEASURES AGAINST STATIC DISCHARGES.

SAF-T-DATA* STORAGE COLOR CODE: RED (FLAMMABLE)

SECTION II - COMPONENTS

COMPONENT	CAS NO.	WEIGHT %	OSHA/PEL	ACGIH/TLV
1,2-DICHLOROETHANE	107-06-2	99-100	1 PPM	10 PPM

SECTION III - PHYSICAL DATA

BOILING POINT: 84 C (183 F) (AT 760 MM HG)	VAPOR PRESSURE (MMHG): 62 (20 C)
MELTING POINT: -36 C (-32 F) (AT 760 MM HG)	VAPOR DENSITY (AIR=1): 3.4
SPECIFIC GRAVITY: 1.25 (H2O=1)	EVAPORATION RATE: 6.5 (BUTYL ACETATE = 1)
SOLUBILITY(H2O): SLIGHT (0.1-1%)	% VOLATILES BY VOLUME: 100 (21 C)
PH: N/A	
ODOR THRESHOLD (P.P.M.): N/A	PHYSICAL STATE: LIQUID
COEFFICIENT WATER/OIL DISTRIBUTION: N/A	
APPEARANCE & ODOR: CLEAR, COLORLESS LIQUID. CHLOROFORM-LIKE ODOR.	

CONTINUED ON PAGE: 3

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC * (800) 424-9300 -- NATIONAL RESPONSE CENTER * (800) 424-8802

D2440 -08
EFFECTIVE: 09/14/89

1,2-DICHLOROETHANE

PAGE: 3
ISSUED: 09/27/91

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP): 13 C (56 F)

NFPA 704M RATING: 2-3-0

AUTOIGNITION TEMPERATURE: 412 C (775 F)

FLAMMABLE LIMITS: UPPER - 15.9 % LOWER - 6.2 %

FIRE EXTINGUISHING MEDIA

USE ALCOHOL FOAM, DRY CHEMICAL OR CARBON DIOXIDE. (WATER MAY BE INEFFECTIVE.)

SPECIAL FIRE-FIGHTING PROCEDURES

FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE & EXPLOSION HAZARDS

VAPORS MAY FLOW ALONG SURFACES TO DISTANT IGNITION SOURCES AND FLASH BACK. CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE. CONTACT WITH STRONG OXIDIZERS MAY CAUSE FIRE.

TOXIC GASES PRODUCED

HYDROGEN CHLORIDE, PHOSGENE, CARBON MONOXIDE, CARBON DIOXIDE

EXPLOSION DATA-SENSITIVITY TO MECHANICAL IMPACT

NONE IDENTIFIED.

EXPLOSION DATA-SENSITIVITY TO STATIC DISCHARGE

NONE IDENTIFIED.

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 40 MG/M3 (10 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): NOT ESTABLISHED

PERMISSIBLE EXPOSURE LIMIT (PEL): 4 MG/M3 (1 PPM)

TOXICITY OF COMPONENTS

CONTINUED ON PAGE: 4

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T

24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC * (800) 424-9300 -- NATIONAL RESPONSE CENTER * (800) 424-8802

D2440 -08
EFFECTIVE: 09/14/89

1,2-DICHLOROETHANE

PAGE: 4
ISSUED: 09/27/91

SECTION V - HEALTH HAZARD DATA (CONTINUED)

ORAL RAT LD50 FOR 1,2-DICHLOROETHANE 670 MG/KG
ORAL MOUSE LD50 FOR 1,2-DICHLOROETHANE 489 MG/KG
SKIN RABBIT LD50 FOR 1,2-DICHLOROETHANE 4886 MG/KG
CARCINOGENICITY: NTP: YES IARC: YES Z LIST: NO OSHA REG: NO

CARCINOGENICITY

THIS SUBSTANCE IS LISTED AS A NTP ANTICIPATED HUMAN CARCINOGEN AND AN IARC ANIMAL CARCINOGEN.

REPRODUCTIVE EFFECTS

NONE IDENTIFIED.

EFFECTS OF OVEREXPOSURE

INHALATION: HEADACHE, NAUSEA, VOMITING, DIZZINESS, NARCOSIS,
RESPIRATORY FAILURE, LOW BLOOD PRESSURE, CENTRAL NERVOUS
SYSTEM DEPRESSION, PULMONARY EDEMA, AND MAY BE FATAL

SKIN CONTACT: SEVERE IRRITATION OR BURNS

EYE CONTACT: SEVERE IRRITATION OR BURNS, PROLONGED CONTACT MAY CAUSE
SKIN SENSITIZATION

SKIN ABSORPTION: RAPID ABSORPTION

INGESTION: HEADACHE, NAUSEA, VOMITING, DIZZINESS, GASTROINTESTINAL
IRRITATION, AND MAY BE FATAL

CHRONIC EFFECTS: DAMAGE TO LIVER, KIDNEYS, LUNGS, BLOOD, CENTRAL NERVOUS
SYSTEM

TARGET ORGANS

KIDNEYS, LIVER, EYES, SKIN, CENTRAL NERVOUS SYSTEM

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

BRONCHITIS, KIDNEY, LIVER, OR BLOOD DISORDERS, HEART DISORDERS, ASTHMA,
CIRCULATORY DISORDERS

PRIMARY ROUTES OF ENTRY

INGESTION, INHALATION, ABSORPTION, EYE CONTACT, SKIN CONTACT

CONTINUED ON PAGE: 5

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

D2440 -08
EFFECTIVE: 09/14/89

1,2-DICHLOROETHANE

PAGE: 5
ISSUED: 09/27/91

SECTION V - HEALTH HAZARD DATA (CONTINUED)

EMERGENCY AND FIRST AID PROCEDURES

INGESTION: CALL A PHYSICIAN. IF SWALLOWED, DO NOT INDUCE VOMITING.

INHALATION: IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.

SKIN CONTACT: IN CASE OF CONTACT, FLUSH SKIN WITH WATER.

EYE CONTACT: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

SARA/TITLE III HAZARD CATEGORIES AND LISTS

ACUTE: YES CHRONIC: YES FLAMMABILITY: YES PRESSURE: NO REACTIVITY: NO

EXTREMELY HAZARDOUS SUBSTANCE: NO

CERCLA HAZARDOUS SUBSTANCE: YES CONTAINS 1,2-DICHLOROETHANE (RQ - 5000 LBS)

SARA 313 TOXIC CHEMICALS: YES CONTAINS 1,2-DICHLOROETHANE (ETHYLENE DICHLORIDE)

GENERIC CLASS: C02

TSCA INVENTORY: YES

STATE LISTS: FOR PRODUCTS SOLD IN THE STATE OF CALIFORNIA, THE STATE REQUIRES THAT WE PROVIDE TO USERS AND THEIR EMPLOYEES THE FOLLOWING MESSAGE: WARNING: THIS PRODUCT IS A CHEMICAL KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

SECTION VI - REACTIVITY DATA

STABILITY: STABLE

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, FLAME, OTHER SOURCES OF IGNITION

INCOMPATIBLES: STRONG OXIDIZING AGENTS, ALUMINUM, MAGNESIUM, AMMONIA,
STRONG BASES, NITRIC ACID, POTASSIUM

DECOMPOSITION PRODUCTS: HYDROGEN CHLORIDE, PHOSGENE, CARBON MONOXIDE, CARBON
DIOXIDE

CONTINUED ON PAGE: 6

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

D2440 -08
EFFECTIVE: 09/14/89

1,2-DICHLOROETHANE

PAGE: 6
ISSUED: 09/27/91

SECTION VII - SPILL & DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. SHUT OFF IGNITION SOURCES; NO FLARES, SMOKING OR FLAMES IN AREA. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE INTO CONTAINER FOR LATER DISPOSAL. FLUSH AREA WITH WATER.

J. T. BAKER SOLUSORB(R) SOLVENT ADSORBENT IS RECOMMENDED FOR SPILLS OF THIS PRODUCT.

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: D001 (IGNITABLE WASTE)

SECTION VIII - INDUSTRIAL PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS ABOVE 10 PPM, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE

SUIT, NEOPRENE GLOVES ARE RECOMMENDED.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA* STORAGE COLOR CODE: RED (FLAMMABLE)

STORAGE REQUIREMENTS

KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY, WELL-VENTILATED, FLAMMABLE LIQUID STORAGE AREA.

SPECIAL PRECAUTIONS

BOND AND GROUND CONTAINERS WHEN TRANSFERRING LIQUID.

CONTINUED ON PAGE: 7

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

D2440 -08
EFFECTIVE: 09/14/89

1,2-DICHLOROETHANE

PAGE: 7
ISSUED: 09/27/91

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME: ETHYLENE DICHLORIDE
HAZARD CLASS: FLAMMABLE LIQUID
UN/NA: UN1184 REPORTABLE QUANTITY: 5000 LBS.
LABELS: FLAMMABLE LIQUID
REGULATORY REFERENCES: 49CFR 172.101; 173.119

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME: ETHYLENE DICHLORIDE
HAZARD CLASS: 3.2, 6.1 I.M.O. PAGE: 3224
UN: UN1184 MARINE POLLUTANTS: NO PACKAGING GROUP: II
LABELS: FLAMMABLE LIQUID, POISON
REGULATORY REFERENCES: 49CFR 172.102; PART 176; IMO

AIR (I.C.A.O.)

PROPER SHIPPING NAME: ETHYLENE DICHLORIDE

HAZARD CLASS: 3.2, 6.1

UN: UN1184

PACKAGING GROUP: II

LABELS: FLAMMABLE LIQUID, POISON

REGULATORY REFERENCES: 49CFR 172.101; 173.6; PART 175; ICAO/IATA

U.S. CUSTOMS HARMONIZATION NUMBER: 29031500007

N/A - NOT APPLICABLE OR NOT AVAILABLE

N/E - NOT ESTABLISHED

THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET MEETS THE REQUIREMENTS OF THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ACT AND REGULATIONS PROMULGATED THEREUNDER (29 CFR 1910.1200 ET. SEQ.) AND THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM. THIS DOCUMENT IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY A PERSON TRAINED IN, OR SUPERVISED BY A PERSON TRAINED IN, CHEMICAL HANDLING. THE USER IS RESPONSIBLE FOR DETERMINING THE PRECAUTIONS AND DANGERS OF THIS CHEMICAL FOR HIS OR HER PARTICULAR APPLICATION. DEPENDING ON USAGE, PROTECTIVE CLOTHING INCLUDING EYE AND FACE GUARDS AND RESPIRATORS MUST BE USED TO AVOID CONTACT WITH MATERIAL OR BREATHING CHEMICAL VAPORS/FUMES.

EXPOSURE TO THIS PRODUCT MAY HAVE SERIOUS ADVERSE HEALTH EFFECTS. THIS CHEMICAL MAY INTERACT WITH OTHER SUBSTANCES. SINCE THE POTENTIAL USES

CONTINUED ON PAGE: 8

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

M A T E R I A L S A F E T Y D A T A S H E E T

24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151

CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

D2440 -08

1,2-DICHLOROETHANE

PAGE: 8

EFFECTIVE: 09/14/89

ISSUED: 09/27/91

ARE SO VARIED, BAKER CANNOT WARN OF ALL OF THE POTENTIAL DANGERS OF USE OR INTERACTION WITH OTHER CHEMICALS OR MATERIALS. BAKER WARRANTS THAT THE CHEMICAL MEETS THE SPECIFICATIONS SET FORTH ON THE LABEL. BAKER DISCLAIMS ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED WITH REGARD TO THE PRODUCT SUPPLIED HEREUNDER, ITS MERCHANTABILITY OR ITS FITNESS FOR A PARTICULAR PURPOSE.

THE USER SHOULD RECOGNIZE THAT THIS PRODUCT CAN CAUSE SEVERE INJURY AND EVEN DEATH, ESPECIALLY IF IMPROPERLY HANDLED OR THE KNOWN DANGERS OF USE ARE NOT HEEDDED. READ ALL PRECAUTIONARY INFORMATION. AS NEW DOCUMENTED GENERAL SAFETY INFORMATION BECOMES AVAILABLE, BAKER WILL PERIODICALLY REVISE THIS MATERIAL SAFETY DATA SHEET.

NOTE: CHEMTREC, CANUTEC, AND NATIONAL RESPONSE CENTER EMERGENCY TELEPHONE NUMBERS ARE TO BE USED ONLY IN THE EVENT OF CHEMICAL EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT INVOLVING CHEMICALS. ALL NON-EMERGENCY QUESTIONS SHOULD BE DIRECTED TO CUSTOMER SERVICE (1-800-JTBAKER) FOR ASSISTANCE.

SECTION I - GENERAL INFORMATIONCATALOG NO N/A
PRODUCT NAME N/A

(REORDER PRODUCT BY THIS NO.)

DATA SHEET NO R430290

1,1-DICHLOROETHYLENE

CHEMICAL NAME ETHENE, 1,1-DICHLORO-

FORMULA CH₂=CCL₂

FORMULA WEIGHT 97

CAS 75-35-4 NRTECS KV9275000

CLASSIFIED BY IARC AS A CLASS 3 CARCINOGEN.

SUBJECT TO THE REPORTING REQUIREMENTS OF SARA TITLE III, SECTION 313.

SYNONYM VINYLIDENE CHLORIDE

MANUFACTURER SUPELCO INC.

PHONE 814-359-3441

ADDRESS SUPELCO PARK, BELLEFONTE, PA 16823-0048

SECTION II - HAZARDOUS INGREDIENTS OF MIXTURES

CHEMICAL NAME

COMMON NAME - PERCENTAGE - CAS #

(FORMULA) - PEL(UNITS) - TLV(UNITS)

LD50 VALUE - CONDITIONS

N/A

SECTION III - PHYSICAL DATA

BOILING POINT 32

C MM MELTING POINT -123 C

VAPOR PRESSURE N/A

VAPOR DENSITY N/A

SPECIFIC GRAVITY 1.21

G/ML

C (WATER=1) PERCENT VOLATILE BY VOLUME 100

WATER SOLUBILITY 0

EVAPORATION RATE N/A

APPEARANCE CLEAR COLORLESS LIQUID

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 14

F

FLAMMABLE LIMITS LEL 7.3 UEL 16.0

EXTINGUISHING MEDIA

CO₂

DRY CHEMICAL

ALCOHOL FOAM.

SPECIAL FIRE FIGHTING PROCEDURES

WEAR SELF CONTAINED BREATHING APPARATUS WHEN FIGHTING A CHEMICAL FIRE.

UNUSUAL FIRE AND EXPLOSION HAZARDS

THE FOLLOWING TOXIC VAPORS ARE FORMED WHEN THIS MATERIAL IS HEATED TO DECOMPOSITION.

HCL

SECTION V - HEALTH HAZARD DATA

LD50 200

MG/KG

ORAL RAT

TLV 5

PPM

PEL 1

PPM

EMERGENCY AND FIRST AID PROCEDURES

EYES

DATE 11/04/91

MATERIAL SAFETY DATA SHEET

PAGE 1

SECTION I - GENERAL INFORMATION
(REORDER PRODUCT BY THIS NO.)

CATALOG NO N/A
PRODUCT NAME N/A

DATA SHEET NO R430290

(1,1-DICHLOROETHYLENE
CHEMICAL NAME ETHENE, 1,1-DICHLORO-
FORMULA CH₂=CCL₂

FORMULA WEIGHT 97

CAS 75-35-4 NRTECS KV9275000

CLASSIFIED BY IARC AS A CLASS 3 CARCINOGEN.

SUBJECT TO THE REPORTING REQUIREMENTS OF SARA TITLE III, SECTION 313.

SYNONYM VINYLIDENE CHLORIDE

MANUFACTURER SUPELCO INC.

PHONE 814-359-3441

ADDRESS SUPELCO PARK, BELLEFONTE, PA 16823-0048

SECTION II - HAZARDOUS INGREDIENTS OF MIXTURES

CHEMICAL NAME

COMMON NAME - PERCENTAGE - CAS #

(FORMULA) - PEL(UNITS) - TLV(UNITS)

LD50 VALUE - CONDITIONS

N/A

SECTION III - PHYSICAL DATA

BOILING POINT 32

C MM MELTING POINT -123 C

VAPOR PRESSURE N/A

VAPOR DENSITY N/A

SPECIFIC GRAVITY 1.21

G/ML

C (WATER=1) PERCENT VOLATILE BY VOLUME 100

WATER SOLUBILITY 0

EVAPORATION RATE N/A

APPEARANCE CLEAR COLORLESS LIQUID

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 14

F

FLAMMABLE LIMITS LEL

7.3 UEL

EXTINGUISHING MEDIA

CO₂

DRY CHEMICAL

ALCOHOL FOAM.

SPECIAL FIRE FIGHTING PROCEDURES

WEAR SELF CONTAINED BREATHING APPARATUS WHEN FIGHTING A CHEMICAL FIRE.

UNUSUAL FIRE AND EXPLOSION HAZARDS

THE FOLLOWING TOXIC VAPORS ARE FORMED WHEN THIS MATERIAL IS HEATED TO DECOMPOSITION.

HCL

SECTION V - HEALTH HAZARD DATA

LD50 200

MG/KG

ORAL RAT

TLV 5

PPM

PEL 1

PPM

EMERGENCY AND FIRST AID PROCEDURES

EYES

DATE 11/04/91

MATERIAL SAFETY DATA SHEET

PAGE 2

CATALOG NO N/A
PRODUCT NAME N/A

(REORDER PRODUCT BY THIS NO.)

DATA SHEET NO R430290

1,1-DICHLOROETHYLENE

SECTION V - HEALTH HAZARD DATA

* CONTINUED *

FLUSH EYES WITH WATER FOR 15 MINUTES.

SKIN

PROMPTLY WASH SKIN WITH MILD SOAP AND LARGE VOLUMES OF WATER.
REMOVE CONTAMINATED CLOTHING.

INHALATION

IMMEDIATELY MOVE TO FRESH AIR.
GIVE OXYGEN IF BREATHING IS LABORED
IF BREATHING STOPS, GIVE ARTIFICIAL RESPIRATION

INGESTION

CONTACT A PHYSICIAN.

EFFECTS OF OVEREXPOSURE

IRRITATES EYES
BURNS SKIN
IRRITATES NOSE AND THROAT
NARCOSIS
REPORTED ANIMAL CARCINOGEN.
CARCINOGENICITY - INDEFINITE IN MAN.SECTION VI - REACTIVITY DATA

STABILITY STABLE.

CONDITIONS TO AVOID

COPPER AND/OR ALUMINUM CAN CAUSE POLYMERIZATION.

INCOMPATIBILITY

OXIDIZING AGENTS
RAPIDLY ADSORBS OXYGEN TO FORM EXPLOSIVE PEROXIDES.

HAZARDOUS DECOMPOSITION PRODUCTS

HCL

HAZARDOUS POLYMERIZATION WILL NOT OCCUR.

CONDITIONS TO AVOID

N/A

DATE 11/04/91

MATERIAL SAFETY DATA SHEET

PAGE 3

CATALOG NO N/A

(REORDER PRODUCT BY THIS NO.)

PRODUCT NAME N/A

DATA SHEET NO R430290

1,1-DICHLOROETHYLENE

* CONTINUED *

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

TAKE UP WITH ABSORBENT MATERIAL.

VENTILATE AREA.

ELIMINATE ALL IGNITION SOURCES.

FLUSH AREA WITH WATER.

WASTE DISPOSAL METHOD

COMPLY WITH ALL APPLICABLE FEDERAL, STATE, OR LOCAL REGULATIONS

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFIC TYPE)

WEAR FACE MASK WITH ORGANIC VAPOR CANISTER.

PROTECTIVE GLOVES

WEAR GLOVES.

E PROTECTION

WEAR PROTECTIVE GLASSES.

VENTILATION

USE ONLY IN EXHAUST HOOD.

SPECIAL

N/A

OTHER PROTECTIVE EQUIPMENT

N/A

SECTION IX - SPECIAL PRECAUTIONS

STORAGE AND HANDLING

STORE IN SEALED CONTAINER IN EXPLOSION PROOF REFRIGERATOR.
KEEP AWAY FROM HEAT.

DATE 11/04/91

MATERIAL SAFETY DATA SHEET

PAGE 4

CATALOG NO N/A
PRODUCT NAME N/A

(REORDER PRODUCT BY THIS NO.)

DATA SHEET NO R430290

1,1-DICHLOROETHYLENE

SECTION IX - SPECIAL PRECAUTIONS

* CONTINUED *

KEEP AWAY FROM OXIDIZERS.

KEEP AWAY FROM IGNITION SOURCES.

OTHER PRECAUTIONS

REPORTED CANCER HAZARD.

AVOID EYE OR SKIN CONTACT.

AVOID BREATHING VAPORS.

WHILE THE INFORMATION AND RECOMMENDATIONS SET FORTH HEREIN ARE BELIEVED TO BE ACCURATE AS OF THE DATE HEREOF, SUPELCO, INC. MAKES NO WARRANTY WITH RESPECT THERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE THEREON.

LAST REVISED 12/28/89

TOTAL P.05

OHS05125

MATERIAL SAFETY DATA SHEET

OCCUPATIONAL HEALTH SERVICES, INC.
11 WEST 42ND STREET, 12TH FLOOR
NEW YORK, NEW YORK 10036
1-800-445-MSDS (1-800-445-6737) OR
1-212-789-3535

FOR EMERGENCY SOURCE INFORMATION
CONTACT: 1-615-366-2000

SUBSTANCE IDENTIFICATION

CAS NUMBER: 156-59-2
RTECS NUMBER: KV9420000

SUBSTANCE: CIS-1,2-DICHLOROETHYLENE

TRADE NAMES/SYNONYMS:

CIS-ACETYLENE DICHLORIDE; 1,2-DICHLOROETHYLENE; C₂H₂CL₂; OHS05125

CHEMICAL FAMILY:

HALOGEN COMPOUND, ALIPHATIC

MOLECULAR FORMULA: C₂H₂CL₂

MOLECULAR WEIGHT: 96.94

CERCLA RATINGS (SCALE 0-3): HEALTH=2 FIRE=3 REACTIVITY=2 PERSISTENCE=1
NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=3 REACTIVITY=2

COMPONENTS AND CONTAMINANTS

COMPONENT: CIS-1,2-DICHLOROETHYLENE
CAS# 156-59-2

PERCENT: 100.0

OTHER CONTAMINANTS: NONE.

EXPOSURE LIMITS:

1,2-DICHLOROETHYLENE (ALL ISOMERS):

200 PPM (793 MG/M³) OSHA TWA200 PPM (793 MG/M³) ACGIH TWA200 PPM (793 MG/M³) NIOSH RECOMMENDED TWA200 PPM (793 MG/M³) DFG MAK TWA;400 PPM (1586 MG/M³) DFG MAK 30 MINUTE PEAK, AVERAGE VALUE, 4 TIMES/SHIFT

MEASUREMENT METHOD: CHARCOAL TUBE/CARBON DISULFIDE; GAS CHROMATOGRAPHY WITH
FLAME IONIZATION DETECTION; (NIOSH VOL. III # 1003, HALOGENATED
HYDROCARBONS).

SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING

PHYSICAL DATA

DESCRIPTION: COLORLESS LIQUID WITH A PLEASANT ODOR.

BOILING POINT: 140 F (60 C) MELTING POINT: -114 F (-81 C)

SPECIFIC GRAVITY: 1.2837 VAPOR PRESSURE: 400 MMHG @ 41 C

SOLUBILITY IN WATER: INSOLUBLE VAPOR DENSITY: 3.34

SOLVENT SOLUBILITY: ACETONE, BENZENE, ETHER, ALCOHOL

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
DANGEROUS FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

MODERATE EXPLOSION HAZARD WHEN EXPOSED TO HEAT OR FLAME.

VAPOR-AIR MIXTURES ARE EXPLOSIVE ABOVE FLASH POINT.

VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL A CONSIDERABLE DISTANCE TO A SOURCE OF IGNITION AND FLASH BACK.

FLASH POINT: 39 F (4 C) (CC) UPPER EXPLOSIVE LIMIT: 12.8

LOWER EXPLOSIVE LIMIT: 9.7 FLAMMABILITY CLASS(OSHA): IB

FIREFIGHTING MEDIA:

DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR REGULAR FOAM
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FIREFIGHTING:

MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT WITHOUT RISK. APPLY COOLING WATER TO SIDES OF CONTAINERS THAT ARE EXPOSED TO FLAMES UNTIL WELL AFTER FIRE IS OUT. STAY AWAY FROM ENDS OF TANKS. FOR MASSIVE FIRE IN CARGO AREA, USE UNMANNED HOSE HOLDER OR MONITOR NOZZLES; IF THIS IS IMPOSSIBLE, WITHDRAW FROM AREA AND LET FIRE BURN. WITHDRAW IMMEDIATELY IN CASE OF RISING SOUND FROM VENTING SAFETY DEVICE OR ANY DISCOLORATION OF TANK DUE TO FIRE. ISOLATE FOR 1/2 MILE IN ALL DIRECTIONS IF TANK, RAIL CAR OR TANK TRUCK IS INVOLVED IN FIRE (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5, GUIDE PAGE 27).

EXTINGUISH ONLY IF FLOW CAN BE STOPPED; USE FLOODING AMOUNTS OF WATER AS A FOG, SOLID STREAMS MAY BE INEFFECTIVE. COOL CONTAINERS WITH FLOODING AMOUNTS OF WATER, APPLY FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING VAPORS, KEEP UPWIND.

WATER MAY BE INEFFECTIVE EXCEPT AS A BLANKET (NFPA 325M, FIRE HAZARD PROPERTIES OF FLAMMABLE LIQUIDS, GASES, AND VOLATILE SOLIDS, 1984)

TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49 CFR 172.101:
FLAMMABLE LIQUID

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49 CFR 172.101 AND
SUBPART E:
FLAMMABLE LIQUID

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: 49 CFR 173.119
EXCEPTIONS: 49 CFR 173.118

FINAL RULE ON HAZARDOUS MATERIALS REGULATIONS (HMR, 49 CFR PARTS 171-180),
DOCKET NUMBERS HM-181, HM-181A, HM-181B, HM-181C, HM-181D AND HM-204.
EFFECTIVE DATE OCTOBER 1, 1991. HOWEVER, COMPLIANCE WITH THE REGULATIONS IS
AUTHORIZED ON AND AFTER JANUARY 1, 1991. (55 FR 52402, 12/21/90)

EXCEPT FOR EXPLOSIVES, INHALATION HAZARDS, AND INFECTIOUS SUBSTANCES, THE
EFFECTIVE DATE FOR HAZARD COMMUNICATION REQUIREMENTS IS EXTENDED TO
OCTOBER 1, 1993. (56 FR 47158, 10/18/91)

U.S. DEPARTMENT OF TRANSPORTATION SHIPPING NAME-ID NUMBER, 49 CFR 172.101:
DICHLOROETHYLENE-UN 1150

U.S. DEPARTMENT OF TRANSPORTATION HAZARD CLASS OR DIVISION, 49 CFR 172.101:
3 - FLAMMABLE LIQUID

U.S. DEPARTMENT OF TRANSPORTATION PACKING GROUP, 49 CFR 172.101:
PG II

U.S. DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS, 49 CFR 172.101
AND SUBPART E:
FLAMMABLE LIQUID

U.S. DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS:
EXCEPTIONS: 49 CFR 173.150
NON-BULK PACKAGING: 49 CFR 173.202
BULK PACKAGING: 49 CFR 173.242

U.S. DEPARTMENT OF TRANSPORTATION QUANTITY LIMITATIONS 49 CFR 172.101:
PASSENGER AIRCRAFT OR RAILCAR: 5 L
CARGO AIRCRAFT ONLY: 60 L

TOXICITY

CIS-1,2-DICHLOROETHYLENE:
TOXICITY DATA: 65000 MG/K3/2 HOURS INHALATION-MOUSE LCLO; 20000 MG/K3/6 HOURS
INHALATION-CAT LCLO; MUTAGENIC DATA (RTECS).
CARCINOGEN STATUS: NONE.
LOCAL EFFECTS: IRRITANT- INHALATION, SKIN, EYE.
ACUTE TOXICITY LEVEL: INSUFFICIENT DATA.
TARGET EFFECTS: CENTRAL NERVOUS SYSTEM DEPRESSANT. POISONING MAY AFFECT THE
LUNGS, LIVER, AND KIDNEYS.
AT INCREASED RISK FROM EXPOSURE: PERSONS WITH CHRONIC RESPIRATORY DISEASE.
ADDITIONAL DATA: STIMULANTS SUCH AS EPINEPHRINE AND EPHEDRINE MAY ENHANCE T

TOXICITY OF SOME HALOGENATED HYDROCARBONS.

HEALTH EFFECTS AND FIRST AID

INHALATION:

1,2-DICHLOROETHYLENE (ALL ISOMERS):

IRRITANT/NARCOTIC. 4000 PPM IMMEDIATELY DANGEROUS TO LIFE OR HEALTH.

ACUTE EXPOSURE- VAPOR EXPOSURE MAY CAUSE MUCOUS MEMBRANE IRRITATION, NAUSEA, VOMITING, DIZZINESS, WEAKNESS, TREMOR, AND EPIGASTRIC CRAMPS. HIGHER LEVELS MAY CAUSE CENTRAL NERVOUS SYSTEM DEPRESSION RANGING FROM DROWSINESS TO UNCONSCIOUSNESS. THE CIS- AND TRANS- ISOMERS TOGETHER HAVE BEEN USED AS AN ANESTHETIC IN MAN. A HUMAN DEATH HAS BEEN REPORTED FROM INDUSTRIAL EXPOSURE. AN 8 HOUR EXPOSURE TO THE TRANS- ISOMER AT 200 PPM LOWERED THE LEUKOCYTE COUNT IN RATS; 1000 PPM CAUSED A FALL IN THE BLOOD SERUM ALBUMIN, UREA NITROGEN, ALKALINE PHOSPHATASE ACTIVITY, AND THE NUMBER OF ERYTHROCYTES. NARCOSIS WAS NOT PRODUCED AT THESE LEVELS. 3000 PPM PRODUCED FIBROUS SWELLING OF THE CARDIAC MUSCLE AND HYPEREMIA WHICH PERSISTED FOR 14 HOURS AFTER EXPOSURE. THE CIS- ISOMER DID NOT ANESTHETIZE RATS IN 4 HOURS AT 8000 PPM, BUT AT 16,000 PPM THEY WERE ANESTHETIZED IN 8 MINUTES AND KILLED IN 4 HOURS. REVERSIBLE SUPERFICIAL CORNEAL TURBIDITY HAS BEEN OBSERVED IN SOME ANESTHETIZED DOGS.

CHRONIC EXPOSURE- VARIATIONS IN DATA EXIST ON THE CHRONIC TOXICITY OF THE CIS- AND TRANS- ISOMERS. RATS EXPOSED TO 200 PPM OF THE TRANS- ISOMER FOR 8 HOURS/DAY, 5 DAYS/WEEK FOR 16 WEEKS SHOWED HISTOLOGICAL EVIDENCE OF SLIGHT TO SEVERE FATTY DEGENERATION OF LIVER LOBULES AND KUPFFER CELLS, MARKED PULMONARY HYPEREMIA, ALVEOLAR SEPTAL DISTENSION AND FIBROUS SWELLING OF THE CARDIAC MUSCLE. SIMILAR EXPOSURES WITH RATS, GUINEA PIGS, RABBITS AND DOGS EXPOSED TO 500 PPM OR 1000 PPM 7 HOURS/DAY, 5 DAYS/WEEK FOR 6 MONTHS TO A MIXTURE OF 60% CIS- AND 40% TRANS- ISOMERS RESULTED IN NO ADVERSE EFFECTS DETECTED. CATS AND RABBITS WERE REPEATEDLY EXPOSED TO VAPOR CONCENTRATIONS OF 0.16-0.19% IN AIR. THE CIS- ISOMER CAUSED ANOREXIA, DECREASED BODY WEIGHT AND PATHOLOGICAL CHANGES IN THE LUNGS, LIVER, AND KIDNEYS. THE TRANS- ISOMER CAUSED ANOREXIA AND SOME RESPIRATORY IRRITATION, BUT NO HISTOPATHOLOGICAL CHANGES IN ORGANS.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:

1,2-DICHLOROETHYLENE (ALL ISOMERS):

IRRITANT.

ACUTE EXPOSURE- DIRECT CONTACT MAY CAUSE IRRITATION. SKIN ABSORPTION MAY OCCUR DUE TO LIPID SOLUBILITY.

CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT MAY CAUSE DERMATITIS.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:

**1,2-DICHLOROETHYLENE (ALL ISOMERS):
IRRITANT.**

ACUTE EXPOSURE- DIRECT CONTACT, OR THE VAPOR IN SUFFICIENT CONCENTRATION, MAY CAUSE IRRITATION. THE TRANS- ISOMER CAUSED BURNING OF THE EYES AT 2000 PPM. REVERSIBLE SUPERFICIAL CORNEAL TURBIDITY HAS BEEN REPORTED AS A SYSTEMIC EFFECT IN DOGS FOLLOWING INHALATION EXPOSURE.

CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT WITH IRRITANTS MAY CAUSE CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:

**1,2-DICHLOROETHYLENE (ALL ISOMERS):
NARCOTIC.**

ACUTE EXPOSURE- DEPENDING ON EXPOSURE, SYMPTOMS MAY VARY FROM SLIGHT CENTRAL NERVOUS SYSTEM DEPRESSION TO DEEP NARCOSIS.

CHRONIC EXPOSURE- USED AS A LOW TEMPERATURE EXTRACTING AGENT FOR HEAT SENSITIVE SUBSTANCES SUCH AS CAFFEINE IN COFFEE, PERFUMES, AND OILS AND FATS FROM FISH AND MEAT. MICE EXPOSED TO 22 MG/KG OR 220 MG/KG OF TRANS-1,2 DICHLOROETHYLENE BY GAVAGE FOR 14 CONSECUTIVE DAYS SHOWED A TREND TOWARD SUPPRESSION OF THE HUMORAL IMMUNE RESPONSE, BUT NO EFFECT ON THE CELL-MEDIATED IMMUNE RESPONSE.

FIRST AID- REMOVE BY GASTRIC LAVAGE OR EMESIS. MAINTAIN BLOOD PRESSURE AND AIRWAY. GIVE OXYGEN IF RESPIRATION IS DEPRESSED. DO NOT PERFORM GASTRIC LAVAGE OR EMESIS IF VICTIM IS UNCONSCIOUS. GET MEDICAL ATTENTION IMMEDIATELY (DREISBACH, HANDBOOK OF POISONING, 12TH ED.). ADMINISTRATION OF GASTRIC LAVAGE OR OXYGEN SHOULD BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL.

ANTIDOTE:

NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

REACTIVITY:

MAY FORM EXPLOSIVE PEROXIDES IN AIR.

UNLESS INHIBITED, GRADUAL DECOMPOSITION BY AIR, LIGHT, ULTAVIOLET LIGHT AND MOISTURE MAY RELEASE CORROSIVE HYDROGEN CHLORIDE.

INCOMPATIBILITIES:

1,2-DICHLOROETHYLENE (ALL ISOMERS):

CAUSTIC ALKALIES (SOLID OR CONCENTRATED SOLUTIONS): MAY FORM EXPLOSIVE, SPONTANEOUSLY FLAMMABLE CHLOROACETYLENE.

COPPER OR COPPER ALLOYS: MAY FORM EXPLOSIVE, SPONTANEOUSLY FLAMMABLE CHLOROACETYLENE.

DIFLUOROMETHYLENE DIHYPOFLUORITE (WITH TRANS-ISOMER): VIOLENT EXPLOSION AT ROOM TEMPERATURE.

FREE RADICAL INITIATOR: OXIDATION FORMS CORROSIVE CHLOROACETYL CHLORIDE VIA EPOXIDE INTERMEDIATES.

METAL (HOT): GRADUAL DECOMPOSITION WITH RELEASE OF CORROSIVE HYDROGEN

CHLORIDE.

NITROGEN TETROXIDE: EXPLOSIVE, ESPECIALLY WHEN SHOCKED.

OXIDIZERS (STRONG): FIRE AND EXPLOSION HAZARD.

OZONE: FORM EXPLOSIVE PRODUCT.

PERCHLORYL FLUORIDE: EXPLOSIVE REACTION ON HEATING.

POTASSIUM HYDROXIDE (SOLID OR CONCENTRATED SOLUTION): MAY FORM EXPLOSIVE, SPONTANEOUSLY FLAMMABLE CHLOROACETYLENE.

PLASTICS, RUBBER AND COATINGS: MAY BE ATTACKED.

SODIUM: MAY FORM EXPLOSIVE, SPONTANEOUSLY FLAMMABLE CHLOROACETYLENE.

SODIUM HYDROXIDE (SOLID OR CONCENTRATED SOLUTION): MAY FORM EXPLOSIVE, SPONTANEOUSLY FLAMMABLE CHLOROACETYLENE.

SULFURIC ACID (CONCENTRATED): OXIDATION FORMS CORROSIVE CHLOROACETYL CHLORIDE VIA EPOXIDE INTERMEDIATES.

STRONG OXIDIZERS: VIGOROUS REACTION OR POSSIBLE FIRE AND EXPLOSION HAZARD.

DECOMPOSITION:

THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE HIGHLY TOXIC FUMES OF PHOSGENE, TOXIC AND CORROSIVE FUMES OF CHLORIDES, AND OXIDES OF CARBON.

POLYMERIZATION:

SLIGHTLY SUSCEPTIBLE TO POLYMERIZATION, BUT NOT LIKELY UNLESS THE MATERIAL BECOMES CONTAMINATED. BOTH ISOMERS DIMERIZE TO TETRACHLOROBUTENE IN THE PRESENCE OF ORGANIC PEROXIDES. THE POLYMERIZATION REACTION IS NOT VIGOROUS.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

****STORAGE****

STORE IN ACCORDANCE WITH 29 CFR 1910.106.

BONDING AND GROUNDING: SUBSTANCES WITH LOW ELECTROCONDUCTIVITY, WHICH MAY BE IGNITED BY ELECTROSTATIC SPARKS, SHOULD BE STORED IN CONTAINERS WHICH MEET THE BONDING AND GROUNDING GUIDELINES SPECIFIED IN NFPA 77-1983, RECOMMENDED PRACTICE ON STATIC ELECTRICITY.

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

****DISPOSAL****

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40 CFR 262. EPA HAZARDOUS WASTE NUMBER D001.

100 POUND CERCLA SECTION 103 REPORTABLE QUANTITY.

CONDITIONS TO AVOID

AVOID CONTACT WITH HEAT, SPARKS, FLAMES, OR OTHER SOURCES OF IGNITION. VAPORS

MAY BE EXPLOSIVE. AVOID OVERHEATING OF CONTAINERS; CONTAINERS MAY VIOLENTLY RUPTURE IN HEAT OF FIRE. AVOID CONTAMINATION OF WATER SOURCES.

SPILL AND LEAK PROCEDURES

OCCUPATIONAL SPILL:

SHUT OFF IGNITION SOURCES. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. NO SMOKING, FLAMES OR FLARES IN HAZARD AREA. KEEP UNNECESSARY PEOPLE AWAY; ISOLATE HAZARD AREA AND RESTRICT ENTRY.

PROTECTIVE EQUIPMENT

VENTILATION:

PROVIDE LOCAL EXHAUST VENTILATION TO MEET PUBLISHED EXPOSURE LIMITS. VENTILATION EQUIPMENT MUST BE EXPLOSION-PROOF.

RESPIRATOR:

THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO CHEMICAL HAZARDS; NIOSH CRITERIA DOCUMENTS OR BY THE U.S. DEPARTMENT OF LABOR, 29 CFR 1910 SUBPART Z.

THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

1,2-DICHLOROETHYLENE (ALL ISOMERS):

1000 PPM- ANY POWERED AIR-PURIFYING RESPIRATOR WITH ORGANIC VAPOR CARTRIDGES.

ANY CHEMICAL CARTRIDGE RESPIRATOR WITH AN ORGANIC VAPOR CANISTER AND A FULL FACEPIECE.

4000 PPM- ANY SUPPLIED-AIR RESPIRATOR OPERATED IN A CONTINUOUS FLOW MODE.

ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR (GAS MASK) WITH A CHIN-STYLE OR FRONT- OR BACK-MOUNTED ORGANIC VAPOR CANISTER.

ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE.

ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.

ESCAPE- ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR (GAS MASK) WITH A CHIN-STYLE OR FRONT- OR BACK-MOUNTED ORGANIC VAPOR CANISTER.

ANY APPROPRIATE ESCAPE-TYPE SELF-CONTAINED BREATHING APPARATUS.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE IN COMBINATION WITH AN

AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

CLOTHING:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:

EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE.

EMERGENCY WASH FACILITIES:

WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES AND/OR SKIN MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN AND QUICK DRENCH SHOWER WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED BY- OCCUPATIONAL HEALTH SERVICES, INC.
CREATION DATE: 03/12/86 REVISION DATE: 11/14/91

OHS05125
156-59-2

CIS-1,2-DICHLOROETHYLENE

Copyright 1991 Occupational Health Services, Inc. All Rights Reserved.
Licensed to: fluor daniel inc.
To make unlimited paper copies for internal distribution and use only.

OHS23670

MATERIAL SAFETY DATA SHEET

OCCUPATIONAL HEALTH SERVICES, INC.
11 WEST 42ND STREET, 12TH FLOOR
NEW YORK, NEW YORK 10036
1-800-445-MSDS (1-800-445-6737) OR
1-212-789-3535

FOR EMERGENCY SOURCE INFORMATION
CONTACT: 1-615-366-2000

SUBSTANCE IDENTIFICATION

CAS NUMBER: 156-60-5
RTECS NUMBER: KV9400000

SUBSTANCE: TRANS-1,2-DICHLOROETHYLENE

TRADE NAMES/SYNONYMS:

TRANS-ACETYLENE DICHLORIDE; TRANS-DICHLOROETHYLENE;
TRANS-1,2-DICHLOROETHENE; RCRA U079; C2H2CL2; OHS23670

CHEMICAL FAMILY:

HALOGEN COMPOUND, ALIPHATIC

MOLECULAR FORMULA: C2-H2-CL2

MOLECULAR WEIGHT: 96.94

CERCLA RATINGS (SCALE 0-3): HEALTH=2 FIRE=3 REACTIVITY=2 PERSISTENCE=1
NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=3 REACTIVITY=2

COMPONENTS AND CONTAMINANTS

COMPONENT: TRANS-1,2-DICHLOROETHYLENE
CAS# 156-60-5

PERCENT: 100.0

OTHER CONTAMINANTS: NONE.

EXPOSURE LIMITS:

1,2-DICHLOROETHYLENE (ALL ISOMERS):

200 PPM (793 MG/M3) OSHA TWA

200 PPM (793 MG/M3) ACGIH TWA

200 PPM (793 MG/M3) NIOSH RECOMMENDED TWA

200 PPM (793 MG/M3) DFG MAK TWA;

400 PPM (1586 MG/M3) DFG MAK 30 MINUTE PEAK, AVERAGE VALUE, 4 TIMES/SHIFT

MEASUREMENT METHOD: CHARCOAL TUBE/CARBON DISULFIDE; GAS CHROMATOGRAPHY WITH
FLAME IONIZATION DETECTION; (NIOSH VOL. III # 1003, HALOGENATED
HYDROCARBONS).

SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING

TRANS-1,2-DICHLOROETHYLENE:

1000 POUNDS CERCLA SECTION 103 REPORTABLE QUANTITY

PHYSICAL DATA

DESCRIPTION: COLORLESS LIQUID WITH A PLEASANT ODOR.

BOILING POINT: 118 F (48 C) MELTING POINT: -58 F (-50 C)

SPECIFIC GRAVITY: 1.2565 VAPOR PRESSURE: 400 MM HG @ 87 F

SOLUBILITY IN WATER: SLIGHTLY SOLUBLE VAPOR DENSITY: 3.34

SOLVENT SOLUBILITY: SOLUBLE IN ETHANOL AND ETHYL ETHER.

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:

DANGEROUS FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

VAPOR-AIR MIXTURES ARE EXPLOSIVE ABOVE FLASH POINT.

VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL A CONSIDERABLE DISTANCE TO A SOURCE OF IGNITION AND FLASH BACK.

FLASH POINT: 36 F (2 C) (CC) UPPER EXPLOSIVE LIMIT: 12.8%

LOWER EXPLOSIVE LIMIT: 9.7% AUTOIGNITION TEMP.: 860 F (460 C)

FLAMMABILITY CLASS(OSHA): IB

FIREFIGHTING MEDIA:

DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR REGULAR FOAM
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FIREFIGHTING:

MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT WITHOUT RISK. APPLY COOLING WATER TO SIDES OF CONTAINERS THAT ARE EXPOSED TO FLAMES UNTIL WELL AFTER FIRE IS OUT. STAY AWAY FROM ENDS OF TANKS. FOR MASSIVE FIRE IN CARGO AREA, USE UNMANNED HOSE HOLDER OR MONITOR NOZZLES; IF THIS IS IMPOSSIBLE, WITHDRAW FROM AREA AND LET FIRE BURN. WITHDRAW IMMEDIATELY IN CASE OF RISING SOUND FROM VENTING SAFETY DEVICE OR ANY DISCOLORATION OF TANK DUE TO FIRE. ISOLATE FOR 1/2 MILE IN ALL DIRECTIONS IF TANK, RAIL CAR OR TANK TRUCK IS INVOLVED IN FIRE (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5, GUIDE PAGE 27).

EXTINGUISH ONLY IF FLOW CAN BE STOPPED; USE FLOODING AMOUNTS OF WATER AS A FOG, SOLID STREAMS MAY BE INEFFECTIVE. COOL CONTAINERS WITH FLOODING AMOUNTS OF WATER, APPLY FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING VAPORS, KEEP UPWIND.

WATER MAY BE INEFFECTIVE EXCEPT AS A BLANKET (NFPA 325M, FIRE HAZARD PROPERTIES OF FLAMMABLE LIQUIDS, GASES, AND VOLATILE SOLIDS, 1984)

TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49 CFR 172.101:
FLAMMABLE LIQUID

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49 CFR 172.101 AND
SUBPART E:
FLAMMABLE LIQUID

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: 49 CFR 173.119
EXCEPTIONS: 49 CFR 173.118

TOXICITY

TRANS-1,2-DICHLOROETHYLENE:

IRRITATION DATA: 500 MG/24 HOURS SKIN-RABBIT MODERATE; 10 MG EYE-RABBIT
MODERATE.

TOXICITY DATA: 4800 MG/M3/10 MINUTES INHALATION-HUMAN TCLO; 75000 MG/M3/2
HOURS INHALATION-MOUSE LCLO; 43000 MG/M3/6 HOURS INHALATION-CAT LCLO;
>5 GM/KG SKIN-RABBIT LD50; 1235 MG/KG ORAL-RAT LD50; 2122 MG/KG ORAL-MOUSE
LD50; 7411 MG/KG INTRAPERITONEAL-RAT LD50; 3952 MG/KG INTRAPERITONEAL-MOUSE
LD50; MUTAGENIC DATA (RTECS).

CARCINOGEN STATUS: NONE.

LOCAL EFFECTS: IRRITANT- INHALATION, SKIN, EYE.

ACUTE TOXICITY LEVEL: MODERATELY TOXIC BY INGESTION; SLIGHTLY TOXIC BY DERMAL
ABSORPTION.

TARGET EFFECTS: CENTRAL NERVOUS SYSTEM DEPRESSANT. POISONING MAY AFFECT THE
LUNG, LIVER AND KIDNEYS.

AT INCREASED RISK FROM EXPOSURE: PERSONS WITH CHRONIC RESPIRATORY DISEASE.

ADDITIONAL DATA: STIMULANTS SUCH AS EPINEPHRINE AND EPHEDRINE MAY ENHANCE
THE TOXICITY OF SOME HALOGENATED HYDROCARBONS.

HEALTH EFFECTS AND FIRST AID

INHALATION:

1,2-DICHLOROETHYLENE (ALL ISOMERS):

IRRITANT/NARCOTIC. 4000 PPM IMMEDIATELY DANGEROUS TO LIFE OR HEALTH.

ACUTE EXPOSURE- VAPOR EXPOSURE MAY CAUSE MUCOUS MEMBRANE IRRITATION, NAUSEA,
VOMITING, DIZZINESS, WEAKNESS, TREMOR, AND EPIGASTRIC CRAMPS. HIGHER
LEVELS MAY CAUSE CENTRAL NERVOUS SYSTEM DEPRESSION RANGING FROM DROWSINESS
TO UNCONSCIOUSNESS. THE CIS- AND TRANS- ISOMERS TOGETHER HAVE BEEN USED AS
AN ANESTHETIC IN MAN. A HUMAN DEATH HAS BEEN REPORTED FROM INDUSTRIAL
EXPOSURE. AN 8 HOUR EXPOSURE TO THE TRANS- ISOMER AT 200 PPM LOWERED THE
LEUKOCYTE COUNT IN RATS; 1000 PPM CAUSED A FALL IN THE BLOOD SERUM
ALBUMIN, UREA NITROGEN, ALKALINE PHOSPHATASE ACTIVITY, AND THE NUMBER OF
ERYTHROCYTES. NARCOSIS WAS NOT PRODUCED AT THESE LEVELS. 3000 PPM PRODUCED
FIBROUS SWELLING OF THE CARDIAC MUSCLE AND HYPEREMIA WHICH PERSISTED FOR
14 HOURS AFTER EXPOSURE. THE CIS- ISOMER DID NOT ANESTHETIZE RATS IN
4 HOURS AT 8000 PPM, BUT AT 16,000 PPM THEY WERE ANESTHETIZED IN 8 MINUTES
AND KILLED IN 4 HOURS. REVERSIBLE SUPERFICIAL CORNEAL TURBIDITY HAS BEEN

OBSERVED IN SOME ANESTHETIZED DOGS.
 CHRONIC EXPOSURE- VARIATIONS IN DATA EXIST ON THE CHRONIC TOXICITY OF THE CIS- AND TRANS- ISOMERS. RATS EXPOSED TO 200 PPM OF THE TRANS- ISOMER FOR 8 HOURS/DAY, 5 DAYS/WEEK FOR 16 WEEKS SHOWED HISTOLOGICAL EVIDENCE OF SLIGHT TO SEVERE FATTY DEGENERATION OF LIVER LOBULES AND KUPFFER CELLS, MARKED PULMONARY HYPEREMIA, ALVEOLAR SEPTAL DISTENSION AND FIBROUS SWELLING OF THE CARDIAC MUSCLE. SIMILAR EXPOSURES WITH RATS, GUINEA PIGS, RABBITS AND DOGS EXPOSED TO 500 PPM OR 1000 PPM 7 HOURS/DAY, 5 DAYS/WEEK FOR 6 MONTHS TO A MIXTURE OF 60% CIS- AND 40% TRANS- ISOMERS RESULTED IN NO ADVERSE EFFECTS DETECTED. CATS AND RABBITS WERE REPEATEDLY EXPOSED TO VAPOR CONCENTRATIONS OF 0.16-0.19% IN AIR. THE CIS- ISOMER CAUSED ANOREXIA, DECREASED BODY WEIGHT AND PATHOLOGICAL CHANGES IN THE LUNGS, LIVER, AND KIDNEYS. THE TRANS- ISOMER CAUSED ANOREXIA AND SOME RESPIRATORY IRRITATION, BUT NO HISTOPATHOLOGICAL CHANGES IN ORGANS.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:

1,2-DICHLOROETHYLENE (ALL ISOMERS):

IRRITANT.

ACUTE EXPOSURE- DIRECT CONTACT MAY CAUSE IRRITATION. SKIN ABSORPTION MAY OCCUR DUE TO LIPID SOLUBILITY.

CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT MAY CAUSE DERMATITIS.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:

1,2-DICHLOROETHYLENE (ALL ISOMERS):

IRRITANT.

ACUTE EXPOSURE- DIRECT CONTACT, OR THE VAPOR IN SUFFICIENT CONCENTRATION, MAY CAUSE IRRITATION. THE TRANS- ISOMER CAUSED BURNING OF THE EYES AT 2000 PPM. REVERSIBLE SUPERFICIAL CORNEAL TURBIDITY HAS BEEN REPORTED AS A SYSTEMIC EFFECT IN DOGS FOLLOWING INHALATION EXPOSURE.

CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT WITH IRRITANTS MAY CAUSE CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:

1,2-DICHLOROETHYLENE (ALL ISOMERS):

NARCOTIC.

ACUTE EXPOSURE- DEPENDING ON EXPOSURE, SYMPTOMS MAY VARY FROM SLIGHT CENTRAL NERVOUS SYSTEM DEPRESSION TO DEEP NARCOSIS.

CHRONIC EXPOSURE- USED AS A LOW TEMPERATURE EXTRACTING AGENT FOR HEAT SENSITIVE SUBSTANCES SUCH AS CAFFEINE IN COFFEE, PERFUMES, AND OILS AND FATS FROM FISH AND MEAT. MICE EXPOSED TO 22 MG/KG OR 220 MG/KG OF

TRANS-1,2 DICHLOROETHYLENE BY GAVAGE FOR 14 CONSECUTIVE DAYS SHOWED A TREND TOWARD SUPPRESSION OF THE HUMORAL IMMUNE RESPONSE, BUT NO EFFECT THE CELL-MEDIATED IMMUNE RESPONSE.

FIRST AID- REMOVE BY GASTRIC LAVAGE OR EMESIS. MAINTAIN BLOOD PRESSURE AND AIRWAY. GIVE OXYGEN IF RESPIRATION IS DEPRESSED. DO NOT PERFORM GASTRIC LAVAGE OR EMESIS IF VICTIM IS UNCONSCIOUS. GET MEDICAL ATTENTION IMMEDIATELY (DREISBACH, HANDBOOK OF POISONING, 12TH ED.). ADMINISTRATION OF GASTRIC LAVAGE OR OXYGEN SHOULD BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL.

ANTIDOTE:

NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

REACTIVITY:

MAY FORM EXPLOSIVE PEROXIDES IN AIR.

UNLESS INHIBITED, GRADUAL DECOMPOSITION BY AIR, LIGHT, ULTRAVIOLET LIGHT AND MOISTURE MAY RELEASE CORROSIVE HYDROGEN CHLORIDE.

INCOMPATIBILITIES:

1,2-DICHLOROETHYLENE (ALL ISOMERS):

CAUSTIC ALKALIES (SOLID OR CONCENTRATED SOLUTIONS): MAY FORM EXPLOSIVE, SPONTANEOUSLY FLAMMABLE CHLOROACETYLENE.

COPPER OR COPPER ALLOYS: MAY FORM EXPLOSIVE, SPONTANEOUSLY FLAMMABLE CHLOROACETYLENE.

DIFLUOROMETHYLENE DIHYPOFLUORITE (WITH TRANS-ISOMER): VIOLENT EXPLOSION AT ROOM TEMPERATURE.

FREE RADICAL INITIATOR: OXIDATION FORMS CORROSIVE CHLOROACETYL CHLORIDE VIA EPOXIDE INTERMEDIATES.

METAL (HOT): GRADUAL DECOMPOSITION WITH RELEASE OF CORROSIVE HYDROGEN CHLORIDE.

NITROGEN TETROXIDE: EXPLOSIVE, ESPECIALLY WHEN SHOCKED.

OXIDIZERS (STRONG): FIRE AND EXPLOSION HAZARD.

OZONE: FORM EXPLOSIVE PRODUCT.

PERCHLORYL FLUORIDE: EXPLOSIVE REACTION ON HEATING.

POTASSIUM HYDROXIDE (SOLID OR CONCENTRATED SOLUTION): MAY FORM EXPLOSIVE, SPONTANEOUSLY FLAMMABLE CHLOROACETYLENE.

PLASTICS, RUBBER AND COATINGS: MAY BE ATTACKED.

SODIUM: MAY FORM EXPLOSIVE, SPONTANEOUSLY FLAMMABLE CHLOROACETYLENE.

SODIUM HYDROXIDE (SOLID OR CONCENTRATED SOLUTION): MAY FORM EXPLOSIVE, SPONTANEOUSLY FLAMMABLE CHLOROACETYLENE.

SULFURIC ACID (CONCENTRATED): OXIDATION FORMS CORROSIVE CHLOROACETYL CHLORIDE VIA EPOXIDE INTERMEDIATES.

STRONG OXIDIZERS: VIGOROUS REACTION OR POSSIBLE FIRE AND EXPLOSION HAZARD.

DECOMPOSITION:

THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE HIGHLY TOXIC FUMES OF PHOSGENE, TOXIC AND CORROSIVE FUMES OF CHLORIDES, AND OXIDES OF CARBON.

POLYMERIZATION:

SLIGHTLY SUSCEPTIBLE TO POLYMERIZATION, BUT NOT LIKELY UNLESS THE MATERIAL

BECOMES CONTAMINATED. BOTH ISOMERS DIMERIZE TO TETRACHLOROBUTENE IN THE PRESENCE OF ORGANIC PEROXIDES. THE POLYMERIZATION REACTION IS NOT VIGOROUS.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

****STORAGE****

STORE IN ACCORDANCE WITH 29 CFR 1910.106.

BONDING AND GROUNDING: SUBSTANCES WITH LOW ELECTROCONDUCTIVITY, WHICH MAY BE IGNITED BY ELECTROSTATIC SPARKS, SHOULD BE STORED IN CONTAINERS WHICH MEET THE BONDING AND GROUNDING GUIDELINES SPECIFIED IN NFPA 77-1983, RECOMMENDED PRACTICE ON STATIC ELECTRICITY.

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

****DISPOSAL****

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40 CFR 262. EPA HAZARDOUS WASTE NUMBER D001.

100 POUND CERCLA SECTION 103 REPORTABLE QUANTITY.

CONDITIONS TO AVOID

AVOID CONTACT WITH HEAT, SPARKS, FLAMES, OR OTHER SOURCES OF IGNITION. VAPORS MAY BE EXPLOSIVE. AVOID OVERHEATING OF CONTAINERS; CONTAINERS MAY VIOLENTLY RUPTURE IN HEAT OF FIRE. AVOID CONTAMINATION OF WATER SOURCES.

SPILL AND LEAK PROCEDURES

OCCUPATIONAL SPILL:

SHUT OFF IGNITION SOURCES. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. NO SMOKING, FLAMES OR FLARES IN HAZARD AREA. KEEP UNNECESSARY PEOPLE AWAY; ISOLATE HAZARD AREA AND RESTRICT ENTRY.

REPORTABLE QUANTITY (RQ): 1000 POUNDS

THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE

METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

PROTECTIVE EQUIPMENT

VENTILATION:

PROVIDE LOCAL EXHAUST VENTILATION TO MEET PUBLISHED EXPOSURE LIMITS.
VENTILATION EQUIPMENT MUST BE EXPLOSION-PROOF.

RESPIRATOR:

THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO CHEMICAL HAZARDS; NIOSH CRITERIA DOCUMENTS OR BY THE U.S. DEPARTMENT OF LABOR, 29 CFR 1910 SUBPART Z.

THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

1,2-DICHLOROETHYLENE (ALL ISOMERS):

1000 PPM- ANY POWERED AIR-PURIFYING RESPIRATOR WITH ORGANIC VAPOR CARTRIDGES.

ANY CHEMICAL CARTRIDGE RESPIRATOR WITH AN ORGANIC VAPOR CANISTER AND A FULL FACEPIECE.

4000 PPM- ANY SUPPLIED-AIR RESPIRATOR OPERATED IN A CONTINUOUS FLOW MODE.

ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR (GAS MASK) WITH A CHIN-STYLE OR FRONT- OR BACK-MOUNTED ORGANIC VAPOR CANISTER.

ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE.

ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.

ESCAPE- ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR (GAS MASK) WITH A CHIN-STYLE OR FRONT- OR BACK-MOUNTED ORGANIC VAPOR CANISTER.

ANY APPROPRIATE ESCAPE-TYPE SELF-CONTAINED BREATHING APPARATUS.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

CLOTHING:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:

EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A
FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE.

EMERGENCY WASH FACILITIES:

WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES AND/OR SKIN MAY BE
EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN
AND QUICK DRENCH SHOWER WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED BY- OCCUPATIONAL HEALTH SERVICES, INC.
CREATION DATE: 09/07/84 REVISION DATE: 01/15/92

OHS23670

156-60-5

TRANS-1,2-DICHLOROETHYLENE

Copyright 1991 Occupational Health Services, Inc. All Rights Reserved.
Licensed to: fluor daniel inc.
To make unlimited paper copies for internal distribution and use only.

OHS06440

MATERIAL SAFETY DATA SHEET

OCCUPATIONAL HEALTH SERVICES, INC.
11 WEST 42ND STREET, 12TH FLOOR
NEW YORK, NEW YORK 10036
1-800-445-MSDS (1-800-445-6737) OR
1-212-789-3535

FOR EMERGENCY SOURCE INFORMATION
CONTACT: 1-615-366-2000

SUBSTANCE IDENTIFICATION

CAS NUMBER: 117-81-7
RTECS NUMBER: TI0350000

SUBSTANCE: DI-(2-ETHYLHEXYL) PHTHALATE

TRADE NAMES/SYNONYMS:

BIS(2-ETHYLHEXYL) PHTHALATE; DI(2-ETHYLHEXYL) PHTHALATE;
1,2-BENZENEDICARBOXYLIC ACID, BIS(2-ETHYLHEXYL)ESTER; DEHP; OCTYL PHTHALATE;
ETHYLHEXYL PHTHALATE; BISOFLEX 81; PHTHALIC ACID DIOCTYL ESTER;
PHTHALIC ACID, BIS(2-ETHYLHEXYL)ESTER; DIETHYLHEXYLPHTHALATE;
DIOCTYL PHTHALATE; DI(ETHYLHEXYL)PHTHALATE; 2-ETHYLHEXYL PHTHALATE;
FLEXIMEL; FLEXOL DOP; KODAFLEX DOP; OCTOIL; DOP; RCRA U028; C24H38O4;
OHS06440

CHEMICAL FAMILY:
ESTER, CARBOXYLIC, AROMATIC

MOLECULAR FORMULA: C₆-H₄(C-O₂-C-H₂-C-H(C₂-H₅)C₄-H₉)₂

MOLECULAR WEIGHT: 390.56

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=1 REACTIVITY=0 PERSISTENCE=2
NFPA RATINGS (SCALE 0-4): HEALTH=0 FIRE=1 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: DI-(2-ETHYLHEXYL) PHTHALATE
CAS# 117-81-7

PERCENT: 100

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:

DI-(2-ETHYLHEXYL) PHTHALATE:

5 MG/M3 OSHA TWA; 10 MG/M3 OSHA STEL
5 MG/M3 ACGIH TWA; 10 MG/M3 ACGIH STEL
5 MG/M3 NIOSH RECOMMENDED TWA; 10 MG/M3 NIOSH RECOMMENDED STEL
10 MG/M3 DFG MAK TWA;
100 MG/M3 DFG MAK 30 MINUTE PEAK, AVERAGE VALUE, 1 TIME/SHIFT

MEASUREMENT METHOD: PARTICULATE FILTER; CARBON DISULFIDE; GAS CHROMATOGRAPHY
WITH FLAME IONIZATION DETECTION; (NIOSH VOL. III # 5020, DI(2-ETHYLHEXYL)
PHTHALATE).

100 POUNDS CERCLA SECTION 103 REPORTABLE QUANTITY
 SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING
 SUBJECT TO CALIFORNIA PROPOSITION 65 CANCER AND/OR REPRODUCTIVE TOXICITY
 WARNING AND RELEASE REQUIREMENTS- (JANUARY 1, 1988)

 PHYSICAL DATA

DESCRIPTION: ALMOST ODORLESS, COLORLESS TO PALE YELLOW, OILY LIQUID.
 BOILING POINT: 723 F (384 C) MELTING POINT: -67 F (-55 C)
 SPECIFIC GRAVITY: 0.981 VAPOR PRESSURE: 1.32 MMHG @ 200 C
 SOLUBILITY IN WATER: 0.005% @ 20 C VAPOR DENSITY: 16
 SOLVENT SOLUBILITY: SOLUBLE IN HEXANE, MINERAL OIL.
 VISCOSITY: 81.4 CP @ 20 C

 FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
 SLIGHT FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.
 FLASH POINT: 420 F (215 C) (OC) LOWER EXPLOSIVE LIMIT: 0.3% @ 474 F (245 C)
 AUTOIGNITION TEMP.: 735 F (390 C) FLAMMABILITY CLASS(OSHA): IIIB
 FIREFIGHTING MEDIA:
 DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR REGULAR FOAM
 (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).
 FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM
 (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).
 FIREFIGHTING:
 MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT WITHOUT RISK. DO NOT SCATTER
 SPILLED MATERIAL WITH HIGH-PRESSURE WATER STREAMS. DIKE FIRE-CONTROL WATER FOR
 LATER DISPOSAL (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5, GUIDE
 PAGE 31).

USE AGENTS SUITABLE FOR TYPE OF SURROUNDING FIRE. AVOID BREATHING HAZARDOUS
 VAPORS, KEEP UPWIND.

WATER OR FOAM MAY CAUSE FROTHING (NFPA 325M, FIRE HAZARD PROPERTIES OF
 FLAMMABLE LIQUIDS, GASES, AND VOLATILE SOLIDS, 1991)

 TOXICITY

DI-(2-ETHYLHEXYL) PHTHALATE:
 IRRITATION DATA: 500 MG/24 HOURS SKIN-RABBIT MILD; 500 MG EYE-RABBIT;

500 MG/24 HOURS EYE-RABBIT MILD.
 TOXICITY DATA: 25 GM/KG SKIN-RABBIT LD50; 10 GM/KG SKIN-GUINEA PIG LD50;
 4 GM/KG SKIN-MOUSE LDLO; 4 GM/KG SKIN-RAT LDLO;
 143 MG/KG ORAL-MAN TDLO; 30,600 MG/KG ORAL-RAT LD50; 30 GM/KG ORAL-MOUSE
 LD50; 34 GM/KG ORAL-RABBIT LD50; 26 GM/KG ORAL-GUINEA PIG LD50; 250 MG/KG
 INTRAVENOUS-RAT LD50; 1060 MG/KG INTRAVENOUS-MOUSE LD50; 30,700 MG/KG
 INTRAPERITONEAL-RAT LD50; 14 GM/KG INTRAPERITONEAL-MOUSE LD50; MUTAGENIC
 DATA (RTECS); REPRODUCTIVE EFFECTS DATA (RTECS); TUMORIGENIC DATA (RTECS).
 CARCINOGEN STATUS: ANTICIPATED HUMAN CARCINOGEN (NTP); ANIMAL SUFFICIENT
 EVIDENCE (IARC GROUP-2B). ORAL ADMINISTRATION SIGNIFICANTLY INCREASED THE
 INCIDENCE OF BENIGN AND MALIGNANT LIVER-CELL TUMORS IN MICE AND RATS, AND A
 DOSE-RESPONSE RELATIONSHIP WAS OBSERVED.
 ACUTE TOXICITY LEVEL: RELATIVELY NON-TOXIC BY DERMAL ABSORPTION AND INGESTION.
 TARGET EFFECTS: NO DATA AVAILABLE.

HEALTH EFFECTS AND FIRST AID

INHALATION:

DI-(2-ETHYLHEXYL) PHTHALATE:

ACUTE EXPOSURE- NO ILL EFFECTS HAVE BEEN REPORTED AT ROOM TEMPERATURE. MIST,
 OR VAPORS FROM HEATED MATERIAL MAY CAUSE IRRITATION WITH COUGHING, SORE
 THROAT, NAUSEA, STAGGERING AND BRONCHITIS. EXPOSURE TO SATURATED VAPORS
 PRODUCED NO DEATHS IN RATS AFTER 2 HOURS; ALL ANIMALS DIED WITHIN THE
 NEXT 2 HOURS.

CHRONIC EXPOSURE- AFTER EXPOSURE OF 6-7 YEARS, PAIN, NUMBNESS, SPASMS,
 WEAKNESS IN THE UPPER AND LOWER EXTREMITIES, POLYNEURITIS AND NEUROSOMATIC
 DYSFUNCTION WAS REPORTED IN WORKERS. INTERMITTENT EXPOSURE OF MICE FOR
 12 WEEKS PRODUCED SIGNS OF DIFFUSE CHRONIC LUNG INFLAMMATION, SIMILAR TO
 A BURN REACTION.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING
 HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST.
 TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:

DI-(2-ETHYLHEXYL) PHTHALATE:

ACUTE EXPOSURE- CONTACT MAY CAUSE IRRITATION AND ECZEMA.

CHRONIC EXPOSURE- NO DATA AVAILABLE.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED
 AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO
 EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL
 ATTENTION IMMEDIATELY.

EYE CONTACT:

DI-(2-ETHYLHEXYL) PHTHALATE:

ACUTE EXPOSURE- DIRECT CONTACT MAY CAUSE REDNESS AND IRRITATION.

CHRONIC EXPOSURE- NO DATA AVAILABLE.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE,
 OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL
 REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:

DI-(2-ETHYLHEXYL) PHTHALATE:
CARCINOGEN.

ACUTE EXPOSURE- INGESTION OF 10 GRAMS PRODUCED MILD GASTRIC DISTURBANCES WITH SYMPTOMS OF NAUSEA, ABDOMINAL PAIN, AND DIARRHEA. A SINGLE DOSE ADMINISTERED TO PREGNANT RODENTS PRODUCED FETAL DEATH, AND SPECIFIC DEVELOPMENTAL ABNORMALITIES IN NEWBORNS.

CHRONIC EXPOSURE- RAT FEEDING STUDIES SHOWED TESTICULAR ATROPHY, HEPATOMEGALY AND PROLIFERATION OF HEPATIC PEROXISOMES. INCREASED RESORPTIONS AND MALFORMED FETUSES WERE PRODUCED WHEN PREGNANT MICE WERE ADMINISTERED 1000 MG/KG. FETAL WEIGHTS WERE ALSO SIGNIFICANTLY SUPPRESSED. ANTERIOR NEURAL TUBE DEFECTS (ANENCEPHALY AND EXENCEPHALY) WERE THE MALFORMATIONS MOST COMMONLY PRODUCED. MATERNAL AND PATERNAL REPRODUCTIVE EFFECTS HAVE BEEN REPORTED FOLLOWING ADMINISTRATION PRIOR TO MATING. HEPATOCELLULAR CARCINOMAS, SOME OF WHICH METASTASIZED, WERE REPORTED IN MICE FOLLOWING REPEATED DIETARY ADMINISTRATION. HEPATOCELLULAR CARCINOMAS AND NEOPLASTIC NODULES WERE REPORTED IN RATS.

FIRST AID- IF THE PERSON IS CONSCIOUS AND NOT CONVULSING, INDUCE EMESIS BY GIVING SYRUP OF IPECAC FOLLOWED BY WATER. (IF VOMITING OCCURS KEEP THE HEAD BELOW THE HIPS TO PREVENT ASPIRATION). REPEAT IN 20 MINUTES IF NOT EFFECTIVE INITIALLY. GIVE ACTIVATED CHARCOAL. IN PATIENTS WITH DEPRESSED RESPIRATION OR IF EMESIS IS NOT PRODUCED, PERFORM GASTRIC LAVAGE CAUTIOUSLY (DREISBACH, HANDBOOK OF POISONING, 12TH ED.). TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GASTRIC LAVAGE SHOULD BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL. GET MEDICAL ATTENTION IMMEDIATELY.

ANTIDOTE:

NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

REACTIVITY:

STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:

DI-(2-ETHYLHEXYL) PHTHALATE:

ACIDS (STRONG): INCOMPATIBLE.

ALKALIES (STRONG): INCOMPATIBLE.

NITRATES: FIRE AND EXPLOSION HAZARD.

OXIDIZERS (STRONG): FIRE AND EXPLOSION HAZARD.

DECOMPOSITION:

THERMAL DECOMPOSITION MAY RELEASE TOXIC AND/OR HAZARDOUS GASES.

POLYMERIZATION:

HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

****STORAGE****

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

****DISPOSAL****

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40CFR 262. EPA HAZARDOUS WASTE NUMBER U028.

CONDITIONS TO AVOID

MAY BURN BUT DOES NOT IGNITE READILY. AVOID CONTACT WITH STRONG OXIDIZERS, EXCESSIVE HEAT, SPARKS, OR OPEN FLAME.

SPILL AND LEAK PROCEDURES

WATER SPILL:

THE CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986 (PROPOSITION 65) PROHIBITS CONTAMINATING ANY KNOWN SOURCE OF DRINKING WATER WITH SUBSTANCES KNOWN TO CAUSE CANCER AND/OR REPRODUCTIVE TOXICITY.

OCCUPATIONAL SPILL:

STOP LEAK IF YOU CAN DO IT WITHOUT RISK. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CLEAN, DRY CONTAINERS FOR LATER DISPOSAL. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY.

REPORTABLE QUANTITY (RQ): 100 POUNDS

THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

PROTECTIVE EQUIPMENT

VENTILATION:

PROVIDE LOCAL EXHAUST VENTILATION TO MEET PUBLISHED EXPOSURE LIMITS. VENTILATION EQUIPMENT MUST BE EXPLOSION-PROOF.

RESPIRATOR:

THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO CHEMICAL HAZARDS; NIOSH CRITERIA DOCUMENTS OR BY THE U.S. DEPARTMENT OF

LABOR, 29 CFR 1910 SUBPART Z.
THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

DI-(2-ETHYLHEXYL) PHTHALATE:

AT ANY DETECTABLE CONCENTRATION:

ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ESCAPE- ANY AIR-PURIFYING, FULL-FACEPIECE RESPIRATOR WITH A HIGH-EFFICIENCY PARTICULATE FILTER.

ANY APPROPRIATE ESCAPE-TYPE, SELF-CONTAINED BREATHING APPARATUS.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

CLOTHING:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:

EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT EYE CONTACT WITH THIS SUBSTANCE.

EMERGENCY EYE WASH: WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED BY- OCCUPATIONAL HEALTH SERVICES, INC.
CREATION DATE: 08/08/85 REVISION DATE: 12/17/91

OHS06440
117-81-7

DI-(2-ETHYLHEXYL) PHTHALATE

Copyright 1991 Occupational Health Services, Inc. All Rights Reserved.
Licensed to: fluor daniel inc.
To make unlimited paper copies for internal distribution and use only.

PROVIDED BY
FLUCH DANIEL
TECHNICAL INFORMATION CENTER
GREENVILLE

PAGE 1

JH508040

MATERIAL SAFETY DATA SHEET

OCCUPATIONAL HEALTH SERVICES, INC.
11 WEST 42ND STREET, 12TH FLOOR
NEW YORK, NEW YORK 10036
1-800-445-MSDS (1-800-445-6737) OR
1-212-789-3535

FOR EMERGENCY SOURCE INFORMATION
CONTACT: 1-615-366-2000

SUBSTANCE IDENTIFICATION

CAS NUMBER: 117-84-0
RTECS NUMBER: TI1925000

SUBSTANCE: DIOCTYL PHTHALATE

TRADE NAMES/SYNONYMS:

PHTHALIC ACID, DIOCTYL ESTER; O-BENZENEDICARBOXYLIC ACID, DIOCTYL ESTER;
1,2-BENZENEDICARBOXYLIC ACID, DIOCTYL ESTER; DNOP; DINOPOL NOP;
DI-N-OCTYL PHTHALATE; DIOCTYL O-PHTHALATE; OCTYL PHTHALATE;
N-OCTYL PHTHALATE; VINICIZER 85; RCRA U107; C24H38O4; JH508040

CHEMICAL FAMILY:

ESTER, CARBOXYLIC, AROMATIC

MOLECULAR FORMULA: C₂₆H₃₄-(C-O₂-(C-H₂)₇-C-H₃)₂

MOLECULAR WEIGHT: 390.62

CERCLA RATINGS (SCALE 0-3): HEALTH=2 FIRE=1 REACTIVITY=0 PERSISTENCE=3
NFPA RATINGS (SCALE 0-4): HEALTH=3 FIRE=1 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: DIOCTYL PHTHALATE
CAS# 117-84-0

PERCENT: 100

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:

DIOCTYL PHTHALATE:

NO OCCUPATIONAL EXPOSURE LIMITS ESTABLISHED BY OSHA, ACGIH, OR NIOSH.

5000 POUNDS CERCLA SECTION 103 REPORTABLE QUANTITY

SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING

PHYSICAL DATA

DESCRIPTION: LIGHT-COLORED, ODORLESS LIQUID

BOILING POINT: 428 F (220 C) AT 5 MMHG MELTING POINT: -22 F (-30 C)

SPECIFIC GRAVITY: 0.9861 VAPOR PRESSURE: <0.2 MMHG AT 150 C

SOLUBILITY IN WATER: INSOLUBLE VAPOR DENSITY: 16

SOLVENT SOLUBILITY: MINERAL OIL, DIMETHYL SULFOXIDE, ETHANOL, BENZENE

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
SLIGHT FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

FLASH POINT: 426 F (219 C)

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR REGULAR FOAM
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FIREFIGHTING:
MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT WITHOUT RISK. DO NOT SCATTER
SPILLED MATERIAL WITH HIGH-PRESSURE WATER STREAMS. DIKE FIRE-CONTROL WATER FOR
LATER DISPOSAL (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5, GUIDE
PAGE 31).

USE AGENTS SUITABLE FOR TYPE OF SURROUNDING FIRE. AVOID BREATHING HAZARDOUS
VAPORS, KEEP UPWIND.

WATER OR FOAM MAY CAUSE FROTHING (NFPA 325M, FIRE HAZARD PROPERTIES OF
FLAMMABLE LIQUIDS, GASES, AND VOLATILE SOLIDS, 1984)

TOXICITY

DIOCTYL PHTHALATE:
IRRITATION DATA: 500 MG/24 HOURS SKIN-RABBIT MILD; 5 MG EYE-RABBIT SEVERE;
500 MG/24 HOURS EYE-RABBIT MILD.
TOXICITY DATA: 6513 MG/KG ORAL-MOUSE LD50; 65 GM/KG INTRAPERITONEAL-MOUSE
LD50; REPRODUCTIVE EFFECTS DATA (RTECS).
CARCINOGEN STATUS: NONE.
LOCAL EFFECTS: CORROSIVE- EYE; IRRITANT-INHALATION AND SKIN.
ACUTE TOXICITY LEVEL: SLIGHTLY TOXIC BY INGESTION.
TARGET EFFECTS: CENTRAL NERVOUS SYSTEM DEPRESSANT.

HEALTH EFFECTS AND FIRST AID

INHALATION:
DIOCTYL PHTHALATE:
IRRITANT.

ACUTE EXPOSURE- MOST PHTHALATE ESTERS HAVE A LOW VOLATILITY AND THUS
INHALATION OF THESE AGENTS GENERALLY DOES NOT PRESENT PROBLEMS OF AN
ACUTE NATURE. INHALATION OF SUFFICIENT QUANTITIES MAY CAUSE IRRITATION.

PAGE 3

CHRONIC EXPOSURE- NO DATA AVAILABLE.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:

DIOCTYL PHTHALATE:

IRRITANT.

ACUTE EXPOSURE- MAY CAUSE IRRITATION.

CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT MAY CAUSE DERMATITIS.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:

DIOCTYL PHTHALATE:

CORROSIVE.

ACUTE EXPOSURE- MAY CAUSE SEVERE IRRITATION AND POSSIBLE CORNEAL DAMAGE.

CHRONIC EXPOSURE- NO DATA AVAILABLE.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). CONTINUE IRRIGATING WITH NORMAL SALINE UNTIL THE PH HAS RETURNED TO NORMAL (30-60 MINUTES). COVER WITH STERILE BANDAGES. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:

DIOCTYL PHTHALATE:

NARCOTIC.

ACUTE EXPOSURE- MAY CAUSE CENTRAL NERVOUS SYSTEM DEPRESSION WITH NAUSEA, VOMITING, DIZZINESS, WEAKNESS, HEADACHE, AND DIFFICULT RESPIRATION. A

LARGE DOSE WAS REQUIRED TO CAUSE DEATH IN ANIMALS.

CHRONIC EXPOSURE- NO DATA AVAILABLE.

FIRST AID- TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ADVICE IMMEDIATELY AS TO WHETHER TO INDUCE VOMITING.

ANTIDOTE:

NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

REACTIVITY:

STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:

DIOCTYL PHTHALATE:

NO DATA AVAILABLE

PAGE 4

DECOMPOSITION:

THERMAL DECOMPOSITION MAY RELEASE TOXIC AND/OR HAZARDOUS GASES.

POLYMERIZATION:

NO DATA AVAILABLE.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

****DISPOSAL****

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40CFR 262. EPA HAZARDOUS WASTE NUMBER U107.

CONDITIONS TO AVOID

AVOID HEATING TO THE FLASH POINT, 118 F (TYPE II) AND <100 F FOR TYPE LC. AVOID CONTACT WITH OR STORAGE WITH INCOMPATIBLE MATERIALS INCLUDING THOSE LISTED IN THE REACTIVITY SECTION.

SPILL AND LEAK PROCEDURES**OCCUPATIONAL SPILL:**

SHUT OFF IGNITION SOURCES. PROVIDE VENTILATION. WEAR PERSONAL PROTECTIVE EQUIPMENT. USE WATER SPRAY TO REDUCE VAPORS. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER INCOMBUSTIBLE ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. CLOSE TIGHTLY AND LABEL FLAMMABLE OR COMBUSTIBLE. NO SMOKING, FLAMES OR FLARES IN HAZARD AREA. KEEP UNNECESSARY PEOPLE AWAY; ISOLATE AREA AND DENY ENTRY. KEEP OUT OF SEWERS, WATER WAYS AND OTHER WATER SOURCES.

REPORTABLE QUANTITY (RQ): 5000 POUNDS

THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

PROTECTIVE EQUIPMENT**VENTILATION:**

PROVIDE LOCAL EXHAUST VENTILATION SYSTEM.

RESPIRATOR:

THE FOLLOWING RESPIRATORS ARE RECOMMENDED BASED ON INFORMATION FOUND IN THE

PAGE 5

PHYSICAL DATA, TOXICITY AND HEALTH EFFECTS SECTIONS. THEY ARE RANKED IN ORDER FROM MINIMUM TO MAXIMUM RESPIRATORY PROTECTION. THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST BE BASED ON THE SPECIFIC OPERATION, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND MUST BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

ANY CHEMICAL CARTRIDGE RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE(S) AND A FULL FACEPIECE.

ANY GAS MASK WITH ORGANIC VAPOR CANISTER (CHIN-STYLE OR FRONT- OR BACK-MOUNTED CANISTER), WITH A FULL FACEPIECE.

ANY TYPE 'C' SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE OR WITH A FULL FACEPIECE, HELMET OR HOOD OPERATED IN A CONTINUOUS-FLOW MODE.

ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

CLOTHING:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:

EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT EYE CONTACT WITH THIS SUBSTANCE.

EMERGENCY EYE WASH: WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED BY- OCCUPATIONAL HEALTH SERVICES, INC.
CREATION DATE: 07/01/86 REVISION DATE: 04/04/91

OHS08040

-> d all 110 1

110 ANSWER 1 OF 1

*
* MSDS Canadian Centre for Occupational Health and Safety *
*

AN 363778 MSDS-CCOHS

PRODUCT NAME(S): ***ETHYLBENZENE***

PRODUCT IDENTIFICATION: VAN WATERS & ROGERS MSDS NO.: P3607

SUPPLIER(S)/DISTRIBUTOR(S): Van Waters & Rogers Ltd (Canada)

9800 Van Horne Way
Richmond British Columbia
Canada V6X 1W5

Emergency Telephone: 800-424-9300 (CHEMTREC)

DATE OF MSDS: 17 Oct 1990

P 7.3 ETHYLBENZENE

VAN WATERS & ROGERS LTD. 9800 VAN HORNE WAY RICHMOND, B.C. V6X 1W5

WHMIS CODES: B.2 D.2B

-----EMERGENCY ASSISTANCE-----

FOR EMERGENCY ASSISTANCE INVOLVING CHEMICALS CALL CHEMTREC
(800) 424-9300.

-----FOR PRODUCT AND SALES INFORMATION-----

CONTACT YOUR LOCAL VAN WATERS & ROGERS BRANCH OFFICE

-----PRODUCT IDENTIFICATION-----

PRODUCT NAME: ETHYLBENZENE CAS NO.: 100-41-4
COMMON NAMES/SYNONYMS: PHENYLETHANE; EB VW&R CODE: P3607

FORMULA: C8 H10
HAZARD RATING (NFPA 49)
HEALTH: 2
FIRE: 3
REACTIVITY: 0
SPECIAL: NONE

DATE ISSUED: 10/90
SUPERCEDES: 07/90
HAZARD RATING SCALE:
0-MINIMAL 3-SERIOUS
1-SLIGHT 4-SEVERE
2-MODERATE

-----HAZARDOUS INGREDIENTS-----

COMPONENT	CAS NO	%	EXPOSURE LIMITS, PPM			HAZARD
			OSHA PEL	ACGIH TLV	OTHER LIMIT	
ETHYLBENZENE	100-41-4	>99	100	100	SEE BELOW	FLAMMABLE
BENZENE	71-43-2	<0.7	10	10	SEE BELOW	FLAMMABLE, CARCINOGEN

OTHER LIMIT:

ETHYLBENZENE

ACGIH 125 PPM STEL

BENZENE

OSHA 25 PPM CEILING; 50 PPM MAXIMUM FOR 10 MIN

-----PHYSICAL PROPERTIES-----

BOILING POINT, DEG F: 277 VAPOR PRESSURE, MM HG/20 DEG C: 7
 MELTING POINT, DEG F: N/D VAPOR DENSITY (AIR-1): 3.7
 SPECIFIC GRAVITY (WATER-1): 0.86 WATER SOLUBILITY, %: NIL
 APPEARANCE AND ODOR: EVAPORATION RATE (BUTYL ACETATE-1): <1
 COLORLESS LIQUID; FRAGRANT ODOR

-----FIRST AID MEASURES-----

IF INHALED: REMOVE TO FRESH AIR. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING. GET IMMEDIATE MEDICAL ATTENTION.

IN CASE OF EYE CONTACT: IMMEDIATELY FLUSH EYES WITH LOTS OF RUNNING WATER FOR 15 MINUTES, LIFTING THE UPPER AND LOWER EYELIDS OCCASIONALLY. GET IMMEDIATE MEDICAL ATTENTION.

IN CASE OF SKIN CONTACT: IMMEDIATELY WASH SKIN WITH LOTS OF SOAP AND WATER. REMOVE CONTAMINATED CLOTHING AND SHOES; WASH BEFORE REUSE. GET MEDICAL ATTENTION IF IRRITATION PERSISTS AFTER WASHING.

IF SWALLOWED: DO NOT INDUCE VOMITING. GET IMMEDIATE MEDICAL ATTENTION. IF VOMITING OCCURS SPONTANEOUSLY, KEEP VICTIM'S HEAD BELOW HIS HIPS TO PREVENT HIS BREATHING THE VOMITUS INTO HIS LUNGS.

-----HEALTH HAZARD INFORMATION-----

PRIMARY ROUTES OF EXPOSURE: SKIN OR EYE CONTACT, INHALATION.

SIGNS AND SYMPTOMS OF EXPOSURE

INHALATION: VAPORS AND MISTS IRRITATE THE NOSE AND THROAT. INHALATION OF HIGHER CONCENTRATIONS MAY CAUSE HEADACHES, NAUSEA, VOMITING, AND COMA. INHALATION OF VERY HIGH CONCENTRATIONS OR PROLONGED EXPOSURE MAY CAUSE ANESTHETIC OR NARCOTIC EFFECTS, AND LETHARGY. CONCENTRATIONS OF 0.5% IN AIR ARE INTOLERABLE TO HUMANS. CONCENTRATIONS OF 1% IN AIR HAS CAUSED LOSS OF CONSCIOUSNESS AND DEATH IN GUINEA PIGS.

EYE CONTACT: VAPORS MAY IRRITATE THE EYES. LIQUID AND MISTS WILL IRRITATE AND MAY CAUSE SLIGHT TRANSIENT CORNEAL INJURY.

SKIN CONTACT: BRIEF CONTACT MAY DRY THE SKIN. PROLONGED OR REPEATED

CONTACT MAY IRRITATE THE SKIN, CAUSING DERMATITIS OR EVEN A BURN.

SWALLOWED: SWALLOWING THE LIQUID MAY RESULT IN VOMITING. IF VOMITING OCCURS SPONTANEOUSLY, DO NOT ALLOW VOMITUS TO BE BREATHED INTO THE LUNGS AS EVEN A SMALL QUANTITY IN THE LUNGS MAY RESULT IN CHEMICAL PNEUMONITIS AND PULMONARY EDEMA/HEMORRHAGE.

CHRONIC EFFECTS OF EXPOSURE: PROLONGED OR REPEATED OVEREXPOSURE MAY CAUSE LIVER, KIDNEY AND POSSIBLY BLOOD OR TESTICULAR EFFECTS

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: NONE REPORTED.

-----TOXICITY DATA-----

ORAL: RAT LD50 - 3500 MG/KG

DERMAL: RABBIT LD50 - 5000 MG/KG

INHALATION: RAT LC50 - 4000 PPM/4 HR

CARCINOGENICITY: THIS MATERIAL IS NOT CONSIDERED TO BE A CARCINOGEN BY THE NATIONAL TOXICOLOGY PROGRAM, THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER, OR THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION.

HOWEVER, THIS PRODUCT CONTAINS TRACE LEVELS OF BENZENE, AN IARC, NTP AND OSHA CARCINOGEN.

C R DATA: RESULTS OF ANIMAL TESTS SUGGEST THAT ETHYLBENZENE MAY HAVE AN ADVERSE EFFECT ON EITHER MALE OR FEMALE REPRODUCTIVE SYSTEMS; HOWEVER, THE DATA ARE INCONCLUSIVE. RESULTS OF TEST TUBE AND ANIMAL MUTAGENICITY TESTS HAVE BEEN NEGATIVE.

-----PERSONAL PROTECTION-----

VENTILATION: LOCAL MECHANICAL EXHAUST VENTILATION CAPABLE OF MAINTAINING EMISSIONS AT THE POINT OF USE BELOW THE LOWEST PEL.

RESPIRATORY PROTECTION: WEAR A NIOSH-APPROVED RESPIRATOR APPROPRIATE FOR THE VAPOR OR MIST CONCENTRATION AT THE POINT OF USE. APPROPRIATE RESPIRATORS MAY BE A FULL FACEPIECE OR A HALF MASK AIR-PURIFYING CARTRIDGE RESPIRATOR EQUIPPED FOR ORGANIC VAPORS/MISTS, A SELF-CONTAINED BREATHING APPARATUS IN THE PRESSURE DEMAND MODE, OR A SUPPLIED-AIR RESPIRATOR.

EYE PROTECTION: CHEMICAL GOGGLES UNLESS A FULL FACEPIECE RESPIRATOR IS ALSO WORN. IT IS GENERALLY RECOGNIZED THAT CONTACT LENSES SHOULD NOT BE WORN WHEN WORKING WITH CHEMICALS BECAUSE CONTACT LENSES MAY CONTRIBUTE TO THE SEVERITY OF AN EYE INJURY.

PROTECTIVE CLOTHING: LONG-SLEEVED SHIRT, TROUSERS, SAFETY SHOES, IMPERVIOUS GLOVES, AND RUBBER APRON.

OTHER PROTECTIVE MEASURES: AN EYEWASH AND SAFETY SHOWER SHOULD BE AVAILABLE AND READY FOR USE.

-----FIRE AND EXPLOSION INFORMATION-----

FLASH POINT, DEG F: 70

FLAMMABLE LIMITS IN AIR, %

METHOD USED: TCC

LOWER: 1.0 UPPER: 6.7

EXTINGUISHING MEDIA: USE WATER SPRAY, DRY CHEMICAL, CO2, OR ALCOHOL FOAM.

SPECIAL FIRE FIGHTING PROCEDURES: FIRE FIGHTERS SHOULD WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. USE WATER SPRAY TO COOL NEARBY CONTAINERS AND STRUCTURES EXPOSED TO FIRE.

UNUSUAL FIRE AND EXPLOSION HAZARDS: AVOID ACCUMULATION OF WATER BECAUSE THIS PRODUCT WILL FLOAT ON WATER AND MAY REIGNITE ON THE SURFACE OF THE WATER. VAPORS FORMED FROM THIS PRODUCT ARE HEAVIER THAN AIR AND MAY TRAVEL ALONG THE SURFACE TO A DISTANT SOURCES OF IGNITION AND FLASHBACK. EXPLOSIVE VAPOR-AIR MIXTURES MAY BE FORMED ABOVE THE FLASH POINT OR BETWEEN THE LOWER AND UPPER FLAMMABLE LIMITS. HOT ORGANIC CHEMICAL VAPORS OR MIST ARE SUSCEPTIBLE TO SUDDEN SPONTANEOUS COMBUSTION WHEN MIXED WITH AIR. IGNITION MAY OCCUR AT TEMPERATURES BELOW THE "AUTO-IGNITION" OR "IGNITION TEMPERATURE".

-----HAZARDOUS REACTIVITY-----

STABILITY: STABLE POLYMERIZATION: WILL NOT OCCUR
CONDITIONS TO AVOID: HEAT, SPARKS, AND OPEN FLAMES.

MATERIALS TO AVOID: ACIDS, OXIDIZING MATERIALS.

HAZARDOUS DECOMPOSITION PRODUCTS: MAY LIBERATE CARBON MONOXIDE, CARBON DIOXIDE, AND UNIDENTIFIED ORGANIC COMPOUNDS IN BLACK SMOKE.

-----SPILL, LEAK, AND DISPOSAL PROCEDURES-----

ACTION TO TAKE FOR SPILLS OR LEAKS: WEAR PROTECTIVE EQUIPMENT INCLUDING RUBBER BOOTS, RUBBER GLOVES, RUBBER APRON, AND A SELF-CONTAINED BREATHING APPARATUS IN THE PRESSURE DEMAND MODE OR A SUPPLIED-AIR RESPIRATOR. IF THE SPILL OR LEAK IS SMALL, A FULL FACEPIECE AIR-PURIFYING CARTRIDGE RESPIRATOR EQUIPPED FOR ORGANIC VAPORS MAY BE SATISFACTORY. IN ANY EVENT, ALWAYS WEAR EYE PROTECTION. EXTINGUISH ALL IGNITION SOURCES AND ENSURE THAT ALL HANDLING EQUIPMENT IS ELECTRICALLY GROUNDED. FOR SMALL SPILLS OR DRIPS, MOP OR WIPE UP AND DISPOSE OF IN DOT-APPROVED WASTE CONTAINERS. FOR LARGE SPILLS, CONTAIN BY DIKING WITH SOIL OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIALS AND THEN PUMP INTO DOT-APPROVED WASTE CONTAINERS; OR ABSORB WITH NON-COMBUSTIBLE SORBENT MATERIAL, PLACE RESIDUE IN DOT-APPROVED WASTE CONTAINERS. KEEP OUT OF SEWERS, STORM DRAINS, SURFACE WATERS, AND SOIL. COMPLY WITH ALL APPLICABLE GOVERNMENTAL REGULATIONS ON SPILL REPORTING, AND HANDLING AND DISPOSAL OF WASTE.

DISPOSAL METHODS: DISPOSE OF CONTAMINATED PRODUCT AND MATERIALS USED IN CLEANING UP SPILLS OR LEAKS IN A MANNER APPROVED FOR THIS MATERIAL. CONSULT APPROPRIATE FEDERAL, STATE AND LOCAL REGULATORY AGENCIES TO ASCERTAIN PROPER DISPOSAL PROCEDURES.

NOTE: EMPTY CONTAINERS CAN HAVE RESIDUES, GASES AND MISTS AND ARE SUBJECT TO PROPER WASTE DISPOSAL, AS ABOVE.

-----SPECIAL PRECAUTIONS-----

HANDLING AND STORAGE PRECAUTIONS: KEEP AWAY FROM HEAT, SPARKS, AND
FLAMES. STORE IN A COOL, DRY, WELL-VENTILATED PLACE AWAY FROM INCOM-
PATIBLE MATERIALS. VENT CONTAINER FREQUENTLY, AND MORE OFTEN IN WARM
WEATHER, TO RELIEVE PRESSURE. ELECTRICALLY GROUND ALL EQUIPMENT WHEN
HANDLING THIS PRODUCT AND USE ONLY NON-SPARKING TOOLS. KEEP CONTAINER
TIGHTLY CLOSED WHEN NOT IN USE. DO NOT USE PRESSURE TO EMPTY CONTAINER.
WASH THOROUGHLY AFTER HANDLING. DO NOT GET IN EYES, ON SKIN, OR ON
CLOTHING.

REPAIR AND MAINTENANCE PRECAUTIONS: DO NOT CUT, GRIND, WELD, OR DRILL
ON OR NEAR THIS CONTAINER.

OTHER PRECAUTIONS: VAPORS OF THIS PRODUCT ARE HEAVIER THAN AIR AND WILL
COLLECT IN LOW PLACES, SUCH AS PITS OR DEGREASERS, OR OTHER POORLY
VENTILATED AREAS. DO NOT ENTER PLACES WHERE VAPORS ARE SUSPECTED UNLESS
SPECIAL RESPIRATORY PROTECTION IS WORN AND AN OBSERVER IS PRESENT.

OTHER PRECAUTIONS: CONTAINERS, EVEN THOSE THAT HAVE BEEN EMPTIED, WILL
RETAIN PRODUCT RESIDUE AND VAPORS. ALWAYS OBEY HAZARD WARNINGS AND
HANDLE EMPTY CONTAINERS AS IF THEY WERE FULL.

-----PREPARATION INFORMATION-----

CONTACT DOUGLAS EISNER, TECHNICAL DIRECTOR, VAN WATERS & ROGERS INC.
DURING BUSINESS HOURS, EASTERN TIME (416)-741-9190.

-----NOTICE-----

**VAN WATERS & ROGERS LTD. EXPRESSLY DISCLAIMS ALL EXPRESSED OR IMPLIED
WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WITH
RESPECT TO THE PRODUCT PROVIDED.**

-----REVISION-----

10/90: ADDED UNUSUAL FIRE AND EXPLOSION HAZARDS, VENTILATION.
REVISED PROTECTIVE CLOTHING.

----- END OF MSDS -----

-> d all 3

L6 ANSWER 3 OF 8

*
* MSDS Canadian Centre for Occupational Health and Safety *
*

AN 288636 MSDS-CCOHS

PRODUCT NAME(S): ***METHYLENE CHLORIDE***

PRODUCT IDENTIFICATION: J.T. BAKER MSDS NUMBER: M4420
PRODUCT CODES: 5378,9330,9348,9264,9324,Q480,9315
,9329,9341,9128,5531,9313

MANUFACTURER(S): J T BAKER CHEMICAL CO

222 RED SCHOOL LANE
PHILLIPSBURG NEW JERSEY
U.S.A. 08865

Emergency Telephone: 908-859-2151
800-424-9300 (CHEMTREC)
800-424-8802 (NATIONAL RESPONSE CENTER)

DATE OF MSDS: 14 Sep 1989

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC * (800) 424-9300 -- NATIONAL RESPONSE CENTER * (800) 424-8802

M4420 M06 METHYLENE CHLORIDE PAGE: 1
EFFECTIVE: 09/14/89 ISSUED: 03/21/91

J.T.BAKER INC., 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: METHYLENE CHLORIDE
COMMON SYNONYMS: DICHLOROMETHANE; METHYLENE DICHLORIDE; METHANE DICHLORIDE
CHEMICAL FAMILY: CHLORINATED HYDROCARBONS
FORMULA: CH₂CL₂
FORMULA WT.: 84.93
CAS NO.: 75-09-2

NIOSH/RTECS NO.: PA8050000
PRODUCT USE: LABORATORY REAGENT
PRODUCT CODES: 5378,9330,9348,9264,9324,Q480,9315,9329,9341,9128,5531,9313

PRECAUTIONARY LABELING

BAKER SAF-T-DATA* SYSTEM

HEALTH	-	3	SEVERE (CANCER CAUSING)
FLAMMABILITY	-	1	SLIGHT
REACTIVITY	-	1	SLIGHT
CONTACT	-	2	MODERATE

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

U.S. PRECAUTIONARY LABELING

WARNING

MAY BE FATAL IF SWALLOWED OR INHALED. CAUSES IRRITATION. MAY BE HARMFUL IF ABSORBED THROUGH SKIN. NOTE: REPORTED AS CAUSING CANCER IN LABORATORY ANIMALS. EXERCISE DUE CARE. EXCEPTIONAL CONTACT HAZARD: READ MATERIAL SAFETY DATA SHEET.

KEEP AWAY FROM HEAT, MOISTURE, AND DIRECT SUNLIGHT. AVOID CONTACT WITH EYES, SKIN, CLOTHING. DO NOT BREATHE VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF SPILL, SOAK UP WITH SAND OR EARTH.

CONTINUED ON PAGE: 2

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

M4420 M06
EFFECTIVE: 09/14/89

METHYLENE CHLORIDE

PAGE: 2
ISSUED: 03/21/91

PRECAUTIONARY LABELING (CONTINUED)

(
INTERNATIONAL LABELING

HAZARDOUS BY INHALATION. POSSIBLE RISKS OF IRREVERSIBLE EFFECTS.
AVOID CONTACT WITH SKIN.

AF-T-DATA* STORAGE COLOR CODE: BLUE (HEALTH)

SECTION II - COMPONENTS

COMPONENT	CAS NO.	WEIGHT %	OSHA/PEL	ACGIH/TLV
METHYLENE CHLORIDE	75-09-2	98-100	500 PPM	50 PPM

SECTION III - PHYSICAL DATA

BOILING POINT: 40 C (104 F)
(AT 760 MM HG) VAPOR PRESSURE (MMHG): 350
(20 C)

MELTING POINT: -95 C (-139 F)
(AT 760 MM HG) VAPOR DENSITY (AIR-1): 2.9

SPECIFIC GRAVITY: 1.32
(H2O-1) EVAPORATION RATE: 27.5
(BUTYL ACETATE - 1)

SOLUBILITY(H2O): MODERATE (1-10%) % VOLATILES BY VOLUME: 100
(21 C)

PH: N/A

ODOR THRESHOLD (P.P.M.): N/A PHYSICAL STATE: LIQUID

COEFFICIENT WATER/OIL DISTRIBUTION: N/A

APPEARANCE & ODOR: CLEAR, COLORLESS LIQUID. ETHER-LIKE ODOR.

CONTINUED ON PAGE: 3

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC * (800) 424-9300 -- NATIONAL RESPONSE CENTER * (800) 424-8802

44420 M06

METHYLENE CHLORIDE

PAGE: 3

EFFECTIVE: 09/14/89

ISSUED: 03/21/91

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP): N/A

NFPA 704M RATING: 2-1-0

AUTOIGNITION TEMPERATURE: N/A

FLAMMABLE LIMITS: UPPER - 19 % LOWER - 12 %

FIRE EXTINGUISHING MEDIA

USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES

FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE & EXPLOSION HAZARDS

CONCENTRATED VAPOR CAN BE IGNITED BY A HIGH INTENSITY IGNITION SOURCE. VAPOR MAY FORM FLAMMABLE MIXTURE IN ATMOSPHERE THAT CONTAINS A HIGH PERCENTAGE OF OXYGEN. CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE.

TOXIC GASES PRODUCED

HYDROGEN CHLORIDE, PHOSGENE, CHLORINE, CARBON MONOXIDE, CARBON DIOXIDE

EXPLOSION DATA-SENSITIVITY TO MECHANICAL IMPACT

ONE IDENTIFIED.

EXPLOSION DATA-SENSITIVITY TO STATIC DISCHARGE

NONE IDENTIFIED.

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 174 MG/M3 (50 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): NOT ESTABLISHED

PERMISSIBLE EXPOSURE LIMIT (PEL): (500 PPM)

PEL (CEILING) - 1000 PPM.

CONTINUED ON PAGE: 4

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
(CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

EFFECTIVE: 09/14/89

ISSUED: 03/21/91

SECTION V - HEALTH HAZARD DATA (CONTINUED)

TOXICITY OF COMPONENTS

ORAL RAT LD50 FOR METHYLENE CHLORIDE	2136 MG/KG
INTRAPERITONEAL MOUSE LD50 FOR METHYLENE CHLORIDE	437 MG/KG
SUBCUTANEOUS MOUSE LD50 FOR METHYLENE CHLORIDE	6460 MG/KG
INHALATION-30MIN RAT LC50 FOR METHYLENE CHLORIDE	88 G/M3
CARCINOGENICITY: NTP: NO IARC: YES Z LIST: NO OSHA REG: NO	

CARCINOGENICITY

THIS SUBSTANCE IS LISTED AS AN IARC PROBABLE HUMAN CARCINOGEN (GROUPS 2A AND 2B).

REPRODUCTIVE EFFECTS

TESTS ON LABORATORY ANIMALS INDICATE MATERIAL MAY BE MUTAGENIC.

EFFECTS OF OVEREXPOSURE

INHALATION: HEADACHE, NAUSEA, VOMITING, DIZZINESS, NARCOSIS, WEAKNESS, FATIGUE, IRRITATION OF UPPER RESPIRATORY TRACT, CENTRAL NERVOUS SYSTEM DEPRESSION, CAUSES METHEMOGLOBULIN FORMATION IN THE BLOOD, PULMONARY EDEMA, UNCONSCIOUSNESS, AND MAY BE FATAL

SKIN CONTACT: IRRITATION, MAY BE HARMFUL, PROLONGED CONTACT MAY CAUSE DERMATITIS

EYE CONTACT: IRRITATION, MAY CAUSE TEMPORARY CORNEAL DAMAGE

SKIN ABSORPTION: NONE IDENTIFIED

INGESTION: HEADACHE, NAUSEA, VOMITING, DIZZINESS, NARCOSIS, WEAKNESS, FATIGUE, GASTROINTESTINAL IRRITATION, CENTRAL NERVOUS SYSTEM DEPRESSION, CAUSES METHEMOGLOBULIN FORMATION IN THE BLOOD, UNCONSCIOUSNESS, AND MAY BE FATAL

CHRONIC EFFECTS: DAMAGE TO LIVER, KIDNEYS, LUNGS, BLOOD, CENTRAL NERVOUS SYSTEM

TARGET ORGANS

RESPIRATORY SYSTEM, LUNGS, CARDIOVASCULAR SYSTEM, CENTRAL NERVOUS SYSTEM, LIVER, KIDNEYS, EYES, SKIN

CONTINUED ON PAGE: 5

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC * (800) 424-9300 -- NATIONAL RESPONSE CENTER * (800) 424-8802

M4420 M06
EFFECTIVE: 09/14/89

METHYLENE CHLORIDE

PAGE: 5
ISSUED: 03/21/91

SECTION V - HEALTH HAZARD DATA (CONTINUED)

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

CARDIOVASCULAR DISORDERS, HEART DISORDERS, LIVER OR KIDNEY DISORDERS,
CENTRAL NERVOUS SYSTEM DISORDERS, HEAVY DRINKERS, HEAVY SMOKERS

PRIMARY ROUTES OF ENTRY

INHALATION, INGESTION, SKIN CONTACT, EYE CONTACT, ABSORPTION

EMERGENCY AND FIRST AID PROCEDURES

INGESTION: CALL A PHYSICIAN. IF SWALLOWED, DO NOT INDUCE VOMITING.

INHALATION: IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE
ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE
OXYGEN.

SKIN CONTACT: IN CASE OF CONTACT, IMMEDIATELY FLUSH SKIN WITH PLENTY OF
WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED
CLOTHING AND SHOES. WASH CLOTHING BEFORE RE-USE.

EYE CONTACT: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF
WATER FOR AT LEAST 15 MINUTES.

SARA/TITLE III HAZARD CATEGORIES AND LISTS

ACUTE: YES CHRONIC: YES FLAMMABILITY: NO PRESSURE: NO REACTIVITY: NO

EXTREMELY HAZARDOUS SUBSTANCE: NO

CERCLA HAZARDOUS SUBSTANCE: YES CONTAINS 2-BUTANONE (RQ - 5000 LBS)

SARA 313 TOXIC CHEMICALS: YES CONTAINS DICHLOROMETHANE (METHYLENE
CHLORIDE)

GENERIC CLASS: CO2

TS/ INVENTORY: YES

STATE LISTS: FOR PRODUCTS SOLD IN THE STATE OF CALIFORNIA, THE STATE REQUIRES
THAT WE PROVIDE TO USERS AND THEIR EMPLOYEES THE FOLLOWING MESSAGE: WARNING:
THIS PRODUCT IS A CHEMICAL KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

CONTINUED ON PAGE: 6

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC * (800) 424-9300 -- NATIONAL RESPONSE CENTER * (800) 424-8802

M4420 M06
EFFECTIVE: 09/14/89

METHYLENE CHLORIDE

PAGE: 6
ISSUED: 03/21/91

SECTION VI - REACTIVITY DATA

STABILITY: STABLE

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, FLAME, OTHER SOURCES OF IGNITION, MOISTURE,
LIGHT

INCOMPATIBLES: ALKALI METALS, STRONG OXIDIZING AGENTS, STRONG BASES,
OXIDES OF NITROGEN, ZINC, ALUMINUM, WATER, MAGNESIUM,
AMINES, PLASTICS, RUBBER, SODIUM, POTASSIUM

DECOMPOSITION PRODUCTS: HYDROGEN CHLORIDE, PHOSGENE, CHLORINE, CARBON
MONOXIDE, CARBON DIOXIDE

SECTION VII - SPILL & DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. STOP
LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS.
TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE
INTO CONTAINER FOR LATER DISPOSAL. FLUSH SPILL AREA WITH WATER.

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL
ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: U080 (TOXIC WASTE)

SECTION VIII - INDUSTRIAL PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV
REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE

CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS ABOVE 100 PPM, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE SUIT, POLYVINYL ALCOHOL GLOVES ARE RECOMMENDED.

CONTINUED ON PAGE: 7

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC * (800) 424-9300 -- NATIONAL RESPONSE CENTER * (800) 424-8802

M4420 M06
EFFECTIVE: 09/14/89

METHYLENE CHLORIDE

PAGE: 7
ISSUED: 03/21/91

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA* STORAGE COLOR CODE: BLUE (HEALTH)

STORAGE REQUIREMENTS

KEEP CONTAINER TIGHTLY CLOSED. STORE IN SECURE POISON AREA. KEEP CONTAINERS OUT OF SUN AND AWAY FROM HEAT.

SPECIAL PRECAUTIONS

MATERIAL IS HYGROSCOPIC.

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME: DICHLOROMETHANE (AIR ONLY)
HAZARD CLASS: ORM-A
UN/NA: UN1593 REPORTABLE QUANTITY: 1000 LBS.
LABELS: NONE
REGULATORY REFERENCES: 49CFR 172.101; 173.500; 173.510

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME: DICHLOROMETHANE
HAZARD CLASS: 6.1
UN: UN1593 MARINE POLLUTANTS: NO
LABELS: HARMFUL - STOW AWAY FROM FOOD STUFFS
REGULATORY REFERENCES: 49CFR 172.102; PART 176; IMO

I.M.O. PAGE: 6118
PACKAGING GROUP: III

AI (I.C.A.O.)

PROPER SHIPPING NAME: DICHLOROMETHANE

HAZARD CLASS: 6.1

UN: UN1593

PACKAGING GROUP: III

LABELS: HARMFUL - STOW AWAY FROM FOOD STUFFS

REGULATORY REFERENCES: 49CFR 172.101; 173.6; PART 175; ICAO/IATA

U.S. CUSTOMS HARMONIZATION NUMBER: 29031200000

EPA/TSCA EXPORT NOTIFICATION

YES

CONTINUED ON PAGE: 8

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

M A T E R I A L S A F E T Y D A T A S H E E T

24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151

CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

M4420 M06

METHYLENE CHLORIDE

PAGE: 8

EFFECTIVE: 09/14/89

ISSUED: 03/21/91

N/A - NOT APPLICABLE OR NOT AVAILABLE

N/E - NOT ESTABLISHED

THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET MEETS THE REQUIREMENTS OF THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ACT AND REGULATIONS PROMULGATED THEREUNDER (29 CFR 1910.1200 ET. SEQ.) AND THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM. THIS DOCUMENT IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY A PERSON TRAINED IN, OR SUPERVISED BY A PERSON TRAINED IN, CHEMICAL HANDLING. THE USER IS RESPONSIBLE FOR DETERMINING THE PRECAUTIONS AND DANGERS OF THIS CHEMICAL FOR HIS OR HER PARTICULAR APPLICATION. DEPENDING ON USAGE, PROTECTIVE CLOTHING INCLUDING EYE AND FACE GUARDS AND RESPIRATORS MUST BE USED TO AVOID CONTACT WITH MATERIAL OR BREATHING CHEMICAL VAPORS/FUMES.

EXPOSURE TO THIS PRODUCT MAY HAVE SERIOUS ADVERSE HEALTH EFFECTS. THIS CHEMICAL MAY INTERACT WITH OTHER SUBSTANCES. SINCE THE POTENTIAL USES ARE SO VARIED, BAKER CANNOT WARN OF ALL OF THE POTENTIAL DANGERS OF USE OR INTERACTION WITH OTHER CHEMICALS OR MATERIALS. BAKER WARRANTS THAT THE CHEMICAL MEETS THE SPECIFICATIONS SET FORTH ON THE LABEL. BAKER DISCLAIMS ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED WITH REGARD TO THE PRODUCT SUPPLIED HEREUNDER, ITS MERCHANTABILITY OR ITS FITNESS FOR A PARTICULAR PURPOSE.

THE USER SHOULD RECOGNIZE THAT THIS PRODUCT CAN CAUSE SEVERE INJURY AND EVEN DEATH, ESPECIALLY IF IMPROPERLY HANDLED OR THE KNOWN DANGERS OF USE

ARE NOT HEEDED. READ ALL PRECAUTIONARY INFORMATION. AS NEW DOCUMENTED
GENERAL SAFETY INFORMATION BECOMES AVAILABLE, BAKER WILL PERIODICALLY
REVISE THIS MATERIAL SAFETY DATA SHEET.

NOTE: CHEMTREC, CANUTEC, AND NATIONAL RESPONSE CENTER EMERGENCY TELEPHONE
NUMBERS ARE TO BE USED ONLY IN THE EVENT OF CHEMICAL EMERGENCIES INVOLVING
A SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT INVOLVING CHEMICALS. ALL
NON-EMERGENCY QUESTIONS SHOULD BE DIRECTED TO CUSTOMER SERVICE
(1-800-JTBAKER) FOR ASSISTANCE.

COPYRIGHT 1991 J.T.BAKER INC.
* TRADEMARKS OF J.T.BAKER INC.

—
APPROVED BY QUALITY ASSURANCE DEPARTMENT.

-- LAST PAGE --

 *
 * MSDS Canadian Centre for Occupational Health and Safety *
 *

AN 86382 MSDS-CCOHS

PRODUCT NAME(S): Methyl Chloride

MANUFACTURER(S): Ethyl Corporation
 Chemicals Group

 Ethyl Tower
 451 Florida Boulevard
 Baton Rouge Louisiana
 U.S.A. 70801
 Telephone: 504-388-7717

Emergency Telephone: 519-862-1411 In Canada

SUPPLIER(S)/DISTRIBUTOR(S): Ethyl Canada Inc

 220 St Clair Parkway
 Corunna Ontario
 Canada N0N 1G0
 Telephone: 519-862-1411

DATE OF MSDS: 10 Jun 1987

MATERIAL SAFETY DATA SHEET

46.0.1

 PRODUCT IDENTIFICATION
 TRADE NAME: Methyl Chloride
 SYNONYMS: Chloromethane, MeCl
 CHEMICAL NAME: Methyl Chloride
 CHEMICAL FAMILY: Chlorinated hydrocarbon
 CHEMICAL FORMULA: CH3Cl
 CAS NO.: 74-87-3

THIS MATERIAL IS IN COMPLIANCE WITH THE TOXIC
 SUBSTANCES CONTROL ACT (15 USC 2601 - 2629).

 SUMMARY OF HAZARDS
 EXTREMELY FLAMMABLE!
 Liquid may cause frost-bite type burns.
 See "Chronic Effects of Overexposure."

HAZARDOUS COMPONENTS	COMPONENT NAME	CAS NO.	EXPOSURE LIMIT
	Methyl Chloride	74-87-3	100 ppm TWAB/

200 ppm ceiling/
300 ppm 5 min.
peak over any 3
hours (OSHA).
50 ppm TWA8/
100 ppm STEL
(ACGIH). (Ethyl
recommends a 5
ppm TWA8.)

Carcinogenicity listing of the above indicated by: @ -
NTP; * - IARC; & - OSHA; * - Other.

CHEMICAL AND

PHYSICAL PROPERTIES APPEARANCE/ODOR:

Water-white liquified
gas/odorless.
BOILING POINT: -23 deg C/-9 deg F.
VAPOR PRESSURE: 3600 mm Hg @ 20 deg C/68 deg F.
VAPOR DENSITY: 1.8
SOLUBILITY IN WATER: 0.74%
SPECIFIC GRAVITY: 0.920
PERCENT VOLATILE: 100%

FIRE AND

EXPLOSION HAZARDS

FLASH POINT (METHOD): Less than -46 deg C/-50 deg F
(calculated).
FLAMMABLE LIMITS: LEL; 10.7% UEL; 17.4%
EXTINGUISHING MEDIA: Dry chemical, water spray (fog),
foam or carbon dioxide.
HAZARDOUS THERMAL DECOMPOSITION PRODUCTS:
Include hydrogen chloride and
phosgene.
SPECIAL FIRE FIGHTING PROCEDURES:
Do not breathe smoke or vapor.
UNUSUAL FIRE AND EXPLOSION HAZARDS:
Methyl chloride vapor may travel
long distance to source of
ignition and flash back (ignites
in air at 632 deg C/1170 deg F).

REACTIVITY

DATA

STABILITY: Stable.
CONDITIONS TO AVOID: Open flames, welding arcs, or
other high temperature source.
MATERIALS TO AVOID: Oxidizing agents, aluminum,
magnesium, sodium and other alkali
metals.
HAZARDOUS POLYMERIZATION:
Will not occur.

HEALTH HAZARDS

INHALATION: Symptoms of overexposure to vapors
include drowsiness, weakness,
headache, dizziness, and nausea.
EYE CONTACT: Liquid may cause frost-bite type
burns.

SKIN IRRITATION: Liquid may cause frost-bite type burns.

CHRONIC EFFECTS OF OVEREXPOSURE:

Literature data indicate that repeated or prolonged exposure to high concentrations of methyl chloride causes central nervous system effects, liver, kidney, testicular and lung damage, and fetal heart malformations in the laboratory animal.

EMERGENCY FIRST
AID PROCEDURES

INHALATION: Remove to fresh air. If not breathing, give artificial respiration, preferable mouth-to-mouth. If breathing is difficult, give oxygen. Get medical attention.

EYE CONTACT: Immediately flush with plenty of water for at least 15 minutes. Get medical attention.

SKIN CONTACT: Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention.

INGESTION: Give two glasses of water.

EXPOSURE CONTROL
INFORMATION

EXPOSURE LIMITS: See "Hazardous Components" section.

EYE PROTECTION: Chemical goggles when splash may occur.

PROTECTIVE GLOVES: Neoprene or other resistant to chemical penetration.

RESPIRATORY PROTECTION: NIOSH approved supplied-air respirator.

MECHANICAL VENTILATION: Recommended.

LOCAL EXHAUST: At source of vapors.

OTHER: If skin contact or contamination of clothing is likely, protective clothing should be worn.

ENVIRONMENTAL
PROTECTION

SPIILLS OR LEAKS: Evacuate unnecessary personnel. Remove all sources of ignition. Ventilate closed areas thoroughly. Spills, unless very large, evaporate rapidly. Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams. May require excavation of contaminated soil.

DISPOSAL METHODS: Under the CERCLA/RCRA regulations

in effect December 29, 1985, this material is regulated as a hazardous waste or material. Therefore, it must be disposed of in a "permitted" hazardous waste facility in compliance with EPA and/or other applicable local, state, and federal regulations and should be handled in a manner acceptable to good waste management practice (RQ - one pound for methyl chloride.) Store in well ventilated area away from heat, sparks, and open flame.

STORAGE REQUIREMENT:

ADDITIONAL
PRECAUTIONS
OR COMMENTS

Tanks should be grounded and provided with adequate pressure relief valve. Vapors from relief valve should be vented or flared in a safe location. Electrical equipment should be explosion proof; use non-sparking tools.

REVISED: 06/10/87

SUPERSEDES: 11/12/85

MSDS prepared by: Toxicology and Industrial Hygiene Department Ethyl Corporation

FOR ADDITIONAL NONEMERGENCY MSDS INFORMATION, CONTACT:

TOXICOLOGY AND INDUSTRIAL HYGIENE DEPARTMENT ETHYL CORPORATION

THIS MATERIAL SAFETY DATA SHEET CONTAINS AT LEAST
THE INFORMATION REQUIRED BY THE FEDERAL OSHA HAZARD
COMMUNICATION RULE, 29 CFR 1910.1200(g)(2).

0199M

EXPLANATION OF MATERIAL SAFETY DATA SHEET TERMINOLOGY

PRODUCT IDENTIFICATION

TRADE NAME AND SYNONYMS

The name under which the product is sold and common synonyms.

CHEMICAL NAME AND FORMULA

Chemical descriptive name and the chemical formula.

CAS NO.

Chemical Abstract Service registry number which identifies the product.

SUMMARY OF HAZARDS

Emphasizes major hazard(s) associated with the product. Further details are provided in subsequent sections.

COMPONENTS

COMPONENT NAME

Chemical, generic, or proprietary name that identifies the product or components of a mixture. Inclusion of a component is not necessarily based on hazard criteria.

EXPOSURE LIMIT

The airborne concentration at which most workers can be exposed without any expected adverse effects. Source may be Ethyl guideline, ACGIH TLV (R) (Threshold Limit Value), or OSHA PEL (Permissible Exposure Limit).

TYPES OF EXPOSURE LIMITS

TWA8 - the time-weighted average concentration for a normal 8-hour workday and a 40-hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect.

STEL (Short-Term Exposure Limit) - a 15 minute time-weighted average exposure which should not be exceeded at any time during a workday even if the 8-hour time-weighted average is within the TLV.

CEILING - the concentration that should not be exceeded during any part of the working exposure.

Peak - The maximum concentration and duration of exposure allowable above the ceiling concentration for an 8-hour shift.

ACGIH - American Conference of Governmental Industrial Hygienists.

OSHA - Occupational Safety and Health Administration.

NIOSH - National Institute of Occupational Safety and Health.

CARCINOGENICITY LISTING

Indicates whether a component is thought to be a cancer hazard based on human experience and animal data.

NTP - National Toxicology Program.

IARC - International Agency for Research on Cancer.

OTHER - May include preliminary data or studies not yet evaluated by the major agencies. Also includes ACGIH and NIOSH listings.

CHEMICAL AND PHYSICAL PROPERTIES

APPEARANCE/ODOR

Description of material at normal temperature and pressure that may be useful in identifying the presence of the product.

BOILING POINT

The temperature at which the vapor pressure of the liquid is equal to the pressure of the atmosphere.

MELTING POINT (FREEZING POINT)

Temperature at which a substance changes from the solid to liquid state.

VAPOR PRESSURE

The pressure exerted at any temperature by a vapor existing in equilibrium with its liquid or solid phase.

SOLUBILITY IN WATER

The amount of the product, by weight, that will dissolve in a given weight of water at a specified temperature.

grams/100 H₂O

Negligible

< 0.1

Slight

0.1 - 1.0

Moderate

1 - 10

Appreciable

> 10

Compete

Soluble in all proportions

SPECIFIC GRAVITY

Ratio of the weight of a volume of the product to the weight of an equal volume of water (liquids/solids) or air (gases).

EVAPORATION RATE

Ratio of the rate of vaporization of the product to the rate of a known material.

PERCENT VOLATILES

The percentage of the product (liquid or solid) that will evaporate at ambient temperature.

POUR POINT

The lowest temperature at which a liquid will flow when the container is inverted.

VISCOSITY

A measure of flow characteristics of a liquid, expressed in units called Centistokes (cSt).

FIRE AND EXPLOSION HAZARDS

FLASH POINT (CLOSED CUP METHOD)

Lowest temperature at which the product will give off enough vapor to ignite.

FLAMMABLE LIMITS

Range of vapor concentration (percent by volume in air) which will burn or explode in the presence of spark or flame. LEL is the lower explosive limit and UEL is the upper explosive limit.

EXTINGUISHING MEDIA

The fire fighting agents which are recommended for use.

HAZARDOUS THERMAL DECOMPOSITION PRODUCTS

Known hazardous products resulting from heating or burning the compound.

SPECIAL FIREFIGHTING PROCEDURES

General firefighting procedures of chemical fires are not described, but special procedures are given, if required.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Hazards not covered by other sections of the MSDS pertaining to chemical reactions in the presence of heat and/or fire.

REACTIVITY DATA

STABILITY

Indicates the susceptibility of the product to dangerous decomposition.

CONDITIONS AND MATERIALS TO AVOID

Gives the conditions and materials that may cause undesirable reactions or instability of the product.

HAZARDOUS DECOMPOSITION PRODUCTS

Describes the hazardous materials produced from a chemical reaction.

HAZARDOUS POLYMERIZATION

Indicates the tendency of the product's molecules to combine in a violent reaction.

HEALTH HAZARDS

Gives the immediate effects of overexposure to the product by skin or eye contact, breathing vapors or dust, and ingestion. Common symptoms which may occur from exposure to the product are given.

CHRONIC EFFECTS

Refers to the effects that may occur after repeated or prolonged overexposure to the product.

OTHER HEALTH EFFECTS

Includes medical conditions which may be aggravated by exposure to the product.

TOXICITY

Gives numerical results from animal tests on the product. LD50 or LC50 is the dose level that kills half of the animals tested.

EMERGENCY FIRST AID

Gives emergency and first aid instructions for treating overexposure by inhalation, ingestion, and skin and eye contact.

NOTE TO PHYSICIAN

May give any contraindicated treatment or recommended treatment for a licensed health care professional to conduct.

EXPOSURE CONTROL INFORMATION

EYE PROTECTION

Specification of eyes or face protection beyond normal use of safety glasses.

PROTECTIVE GLOVES

Indicates the need for protective gloves when skin contact may occur.

RESPIRATORY PROTECTION

Specification of the type of respirator recommended for use during routine or emergency situations.

VENTILATION

Specification of the type (local/general) of ventilation recommended to capture contaminants or prevent the build-up of hazardous atmospheres.

OTHER

Specification of other recommended personal protective equipment based on type and degree of hazard.

ENVIRONMENTAL PROTECTION

SPILLS AND LEAKS

Indicates special precautions for clean-up of spills and leaks and preparation of chemical for disposal.

DISPOSAL METHOD

Tells the EPA classification of the product as well as the proper disposal procedure.

EPA

Environmental Protection Agency

RQ

Reportable Quantity - The amount of the product or one of its components that, when spilled, must be reported to the EPA and possibly other regulatory agencies.

RCRA - Resource Conservation and Recovery Act.

CERCLA - Comprehensive Environmental Response, Compensation and Liability Act.

STORAGE REQUIREMENTS

Any unusual requirements or precautions for storage of the product.

ADDITIONAL PRECAUTIONS OR COMMENTS

States or re-emphasizes any special precautions or handling requirements.

Although the information and recommendations set forth herein (hereinafter "Information") are presented in good faith and believed to be correct as of the date hereof, Ethyl Corporation makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its safety and suitability for their purposes prior to use. In no event will Ethyl Corporation be responsible for damages of any nature whatsoever resulting from the use of reliance upon information. NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESSED OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE, ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH THE INFORMATION REFERS.

1291C

ISN: 86382

-> d all 4

L13 ANSWER 4 OF 9

*
* MSDS Canadian Centre for Occupational Health and Safety *
*

AN 288637 MSDS-CCOHS

PRODUCT NAME(S): ***METHYL ETHYL KETONE***

PRODUCT IDENTIFICATION: J.T. BAKER MSDS NUMBER: M4628
PRODUCT CODES: 9211,9323,9214,9319,Q531,5385

MANUFACTURER(S): J T BAKER CHEMICAL CO
222 RED SCHOOL LANE
PHILLIPSBURG NEW JERSEY
U.S.A. 08865

Emergency Telephone: 908-859-2151
800-424-9300 (CHEMTREC)
800-424-8802 (NATIONAL RESPONSE CENTER)

DATE OF MSDS: 1 May 1989

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

M4628 M05
EFFECTIVE: 05/01/89

METHYL ETHYL KETONE

PAGE: 1
ISSUED: 03/21/91

J.T.BAKER INC., 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: METHYL ETHYL KETONE
COMMON SYNONYMS: 2-BUTANONE; MEK; ETHYL METHYL KETONE; METHYL ACETONE
CHEMICAL FAMILY: KETONES
FC LA: CH3COCH2CH3
FORMULA WT.: 72.11
CAS NO.: 78-93-3
NIOSH/TECS NO.: EL6475000

PRODUCT USE: LABORATORY REAGENT
PP CT CODES: 9211,9323,9214,9319,Q531,5385

PRECAUTIONARY LABELING

BAKER SAF-T-DATA* SYSTEM

HEALTH	-	2	MODERATE
FLAMMABILITY	-	4	EXTREME (FLAMMABLE)
REACTIVITY	-	2	MODERATE
CONTACT	-	2	MODERATE

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

U.S. PRECAUTIONARY LABELING

DANGER

CAUSES IRRITATION. EXTREMELY FLAMMABLE. HARMFUL IF SWALLOWED OR INHALED. LABORATORY TEST RESULTS INDICATE MATERIAL MAY BE TERATOGENIC. KEEP AWAY FROM HEAT, SPARKS, FLAME. AVOID CONTACT WITH EYES, SKIN, CLOTHING. AVOID BREATHING VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF FIRE, USE ALCOHOL FOAM, DRY CHEMICAL, CARBON DIOXIDE - WATER MAY BE INEFFECTIVE. IN CASE OF SPILL, SOAK UP WITH SAND OR EARTH. FLUSH SPILL AREA WITH WATER.

INTERNATIONAL LABELING

HIGHLY FLAMMABLE.

CONTINUED ON PAGE: 2

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC * (800) 424-9300 -- NATIONAL RESPONSE CENTER * (800) 424-8802

M4628 M05
EFFECTIVE: 05/01/89

METHYL ETHYL KETONE

PAGE: 2
ISSUED: 03/21/91

PRECAUTIONARY LABELING (CONTINUED)

KEEP CONTAINER IN A WELL-VENTILATED PLACE. KEEP AWAY FROM SOURCES OF IGNITION

- NO SMOKING. DO NOT BREATHE VAPOUR. TAKE PRECAUTIONARY MEASURES AGAINST
ST C DISCHARGES.

SAF-T-DATA* STORAGE COLOR CODE: RED (FLAMMABLE)

SECTION II - COMPONENTS

COMPONENT	CAS NO.	WEIGHT %	OSHA/PEL	ACGIH/TLV
METHYL ETHYL KETONE	78-93-3	99-100	200 PPM	200 PPM

SECTION III - PHYSICAL DATA

BOILING POINT: 80 C (176 F)
(AT 760 MM HG) VAPOR PRESSURE (MMHG): 78
(20 C)

MELTING POINT: -87 C (-124 F)
(AT 760 MM HG) VAPOR DENSITY (AIR=1): 2.5

SPECIFIC GRAVITY: 0.81
(H2O=1) EVAPORATION RATE: 5.7
(BUTYL ACETATE = 1)

SOLUBILITY(H2O): APPRECIABLE (>10%) % VOLATILES BY VOLUME: 100
(21 C)

PH: N/A

ODOR THRESHOLD (P.P.M.): N/A PHYSICAL STATE: LIQUID

COEFFICIENT WATER/OIL DISTRIBUTION: N/A

APPEARANCE & ODOR: CLEAR, COLORLESS LIQUID. KETONE-LIKE ODOR.

CONTINUED ON PAGE: 3

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

M4628 M05
EFFECTIVE: 05/01/89

METHYL ETHYL KETONE

PAGE: 3
ISSUED: 03/21/91

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP): -6 C (20 F)

NFPA 704M RATING: 1-3-0

AUTOIGNITION TEMPERATURE: 403 C (759 F)

FLAMMABLE LIMITS: UPPER - 11.4 % LOWER - 1.8 %

FIRE EXTINGUISHING MEDIA

USE ALCOHOL FOAM, DRY CHEMICAL OR CARBON DIOXIDE. (WATER MAY BE INEFFECTIVE.)

SPECIAL FIRE-FIGHTING PROCEDURES

FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE & EXPLOSION HAZARDS

VAPORS MAY FLOW ALONG SURFACES TO DISTANT IGNITION SOURCES AND FLASH BACK. CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE. CONTACT WITH STRONG OXIDIZERS MAY CAUSE FIRE.

TOXIC GASES PRODUCED

CARBON MONOXIDE, CARBON DIOXIDE

EXPLOSION DATA-SENSITIVITY TO MECHANICAL IMPACT

NONE IDENTIFIED.

EXPLOSION DATA-SENSITIVITY TO STATIC DISCHARGE

NONE IDENTIFIED.

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 590 MG/M3 (200 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): 885 MG/M3 (300 PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): 590 MG/M3 (200 PPM)

TOXICITY OF COMPONENTS

CONTINUED ON PAGE: 4

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC * (800) 424-9300 -- NATIONAL RESPONSE CENTER * (800) 424-8802

M/ M05
EFFECTIVE: 05/01/89

METHYL ETHYL KETONE

PAGE: 4
ISSUED: 03/21/91

SECTION V - HEALTH HAZARD DATA (CONTINUED)

ORAL RAT LD50 FOR METHYL ETHYL KETONE 2737 MG/KG
INTRAPERITONEAL MOUSE LD50 FOR METHYL ETHYL KETONE 616 MG/KG
SKIN RABBIT LD50 FOR METHYL ETHYL KETONE 13 G/KG
CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

CARCINOGENICITY

NONE IDENTIFIED.

REPRODUCTIVE EFFECTS

TESTS ON LABORATORY ANIMALS INDICATE MATERIAL MAY BE TERATOGENIC.

EFFECTS OF OVEREXPOSURE

INHALATION: HEADACHE, NAUSEA, VOMITING, DIZZINESS, DROWSINESS,
IRRITATION OF UPPER RESPIRATORY TRACT, UNCONSCIOUSNESS

SKIN CONTACT: IRRITATION, PROLONGED CONTACT MAY CAUSE DERMATITIS

EYE CONTACT: IRRITATION, MAY CAUSE TEMPORARY CORNEAL DAMAGE

SKIN ABSORPTION: NONE IDENTIFIED

INGESTION: HEADACHE, NAUSEA, VOMITING, DIZZINESS, GASTROINTESTINAL
IRRITATION, CENTRAL NERVOUS SYSTEM DEPRESSION

CHRONIC EFFECTS: CENTRAL NERVOUS SYSTEM DEPRESSION

TARGET ORGANS

NASAL SEPTUM, LUNGS, EYES, SKIN, MUCOUS MEMBRANES, IN ANIMALS: LIVER,
KIDNEYS, LUNGS, SPLEEN, BRAIN

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

RESPIRATORY SYSTEM DISEASE, SKIN DISORDERS

PRIMARY ROUTES OF ENTRY

INHALATION, INGESTION, EYE CONTACT, SKIN CONTACT

CONTINUED ON PAGE: 5

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

M4628 M05
EFFECTIVE: 05/01/89

METHYL ETHYL KETONE

PAGE: 5
ISSUED: 03/21/91

SECTION V - HEALTH HAZARD DATA (CONTINUED)

EMERGENCY AND FIRST AID PROCEDURES

INGESTION: CALL A PHYSICIAN. IF SWALLOWED, DO NOT INDUCE VOMITING.

INHALATION: IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.

SKIN CONTACT: IN CASE OF CONTACT, FLUSH SKIN WITH WATER.

EYE CONTACT: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

SARA/TITLE III HAZARD CATEGORIES AND LISTS

ACUTE: YES CHRONIC: YES FLAMMABILITY: YES PRESSURE: NO REACTIVITY: NO

EXTREMELY HAZARDOUS SUBSTANCE: NO

CERCLA HAZARDOUS SUBSTANCE: YES CONTAINS METHYL ETHYL KETONE (RQ - 1 LB)

SARA 313 TOXIC CHEMICALS: YES CONTAINS METHYL ETHYL KETONE

GENERIC CLASS: C07

TSCA INVENTORY: YES

SECTION VI - REACTIVITY DATA

STABILITY: STABLE

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, FLAME, OTHER SOURCES OF IGNITION

INCOMPATIBLES: STRONG OXIDIZING AGENTS, STRONG BASES, CAUSTICS,
MINERAL ACIDS, AMINES AND AMMONIA, HALOGENS, PLASTICS,
RUBBER

DECOMPOSITION PRODUCTS: CARBON MONOXIDE, CARBON DIOXIDE

CONTINUED ON PAGE: 6

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

M4628 M05
EFFECTIVE: 05/01/89

METHYL ETHYL KETONE

PAGE: 6
ISSUED: 03/21/91

SECTION VII - SPILL & DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. SHUT OFF IGNITION SOURCES; NO FLARES, SMOKING OR FLAMES IN AREA. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE INTO CONTAINER FOR LATER DISPOSAL. FLUSH AREA WITH WATER.

J. T. BAKER SOLUSORB(R) SOLVENT ADSORBENT IS RECOMMENDED FOR SPILLS OF THIS PRODUCT.

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: U159 (TOXIC WASTE)

SECTION VIII - INDUSTRIAL PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 1000 PPM, A CHEMICAL CARTRIDGE RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS RECOMMENDED.

EYE/SKIN PROTECTION: SAFETY GOGGLES, UNIFORM, APRON, BUTYL RUBBER GLOVES ARE RECOMMENDED.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SA -DATA* STORAGE COLOR CODE: RED (FLAMMABLE)

STORAGE REQUIREMENTS

KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY, WELL-VENTILATED,
FLAMMABLE LIQUID STORAGE AREA. ISOLATE FROM INCOMPATIBLE MATERIALS.

CONTINUED ON PAGE: 7

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

M4628 M05
EFFECTIVE: 05/01/89

METHYL ETHYL KETONE

PAGE: 7
ISSUED: 03/21/91

SECTION IX - STORAGE AND HANDLING PRECAUTIONS (CONTINUED)

SPECIAL PRECAUTIONS

BOND AND GROUND CONTAINERS WHEN TRANSFERRING LIQUID.

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME: METHYL ETHYL KETONE
HAZARD CLASS: FLAMMABLE LIQUID
UN/NA: UN1193 REPORTABLE QUANTITY: 5000 LBS.
LABELS: FLAMMABLE LIQUID
REGULATORY REFERENCES: 49CFR 172.101; 173.119

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME: METHYL ETHYL KETONE
HAZARD CLASS: 3.2 I.M.O. PAGE: 3080
UN: UN1193 MARINE POLLUTANTS: NO PACKAGING GROUP: II
LABELS: FLAMMABLE LIQUID
REGULATORY REFERENCES: 49CFR 172.102; PART 176; IMO

AIR (I.C.A.O.)

PROPER SHIPPING NAME: METHYL ETHYL KETONE
HAZARD CLASS: 3.2
UN N1193 PACKAGING GROUP: II
LABELS: FLAMMABLE LIQUID
REGULATORY REFERENCES: 49CFR 172.101; 173.6; PART 175; ICAO/IATA

U.S. CUSTOMS HARMONIZATION NUMBER: 29141200007

N/A - NOT APPLICABLE OR NOT AVAILABLE

N/E - NOT ESTABLISHED

THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET MEETS THE REQUIREMENTS OF THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ACT AND REGULATIONS PROMULGATED THEREUNDER (29 CFR 1910.1200 ET. SEQ.) AND THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM. THIS DOCUMENT IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF
CONTINUED ON PAGE: 8

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC * (800) 424-9300 -- NATIONAL RESPONSE CENTER * (800) 424-8802

M4628 M05
EFFECTIVE: 05/01/89

METHYL ETHYL KETONE

PAGE: 8
ISSUED: 03/21/91

THE MATERIAL BY A PERSON TRAINED IN, OR SUPERVISED BY A PERSON TRAINED IN, CHEMICAL HANDLING. THE USER IS RESPONSIBLE FOR DETERMINING THE PRECAUTIONS AND DANGERS OF THIS CHEMICAL FOR HIS OR HER PARTICULAR APPLICATION. DEPENDING ON USAGE, PROTECTIVE CLOTHING INCLUDING EYE AND FACE GUARDS AND RESPIRATORS MUST BE USED TO AVOID CONTACT WITH MATERIAL OR BREATHING CHEMICAL VAPORS/FUMES.

EXPOSURE TO THIS PRODUCT MAY HAVE SERIOUS ADVERSE HEALTH EFFECTS. THIS CHEMICAL MAY INTERACT WITH OTHER SUBSTANCES. SINCE THE POTENTIAL USES ARE SO VARIED, BAKER CANNOT WARN OF ALL OF THE POTENTIAL DANGERS OF USE OR INTERACTION WITH OTHER CHEMICALS OR MATERIALS. BAKER WARRANTS THAT THE CHEMICAL MEETS THE SPECIFICATIONS SET FORTH ON THE LABEL. BAKER DISCLAIMS ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED WITH REGARD TO THE PRODUCT SUPPLIED HEREUNDER, ITS MERCHANTABILITY OR ITS FITNESS FOR A PARTICULAR PURPOSE.

THE USER SHOULD RECOGNIZE THAT THIS PRODUCT CAN CAUSE SEVERE INJURY AND EVEN DEATH, ESPECIALLY IF IMPROPERLY HANDLED OR THE KNOWN DANGERS OF USE ARE NOT HEEDDED. READ ALL PRECAUTIONARY INFORMATION. AS NEW DOCUMENTED GENERAL SAFETY INFORMATION BECOMES AVAILABLE, BAKER WILL PERIODICALLY REVISE THIS MATERIAL SAFETY DATA SHEET.

NOTE: CHEMTREC, CANUTEC, AND NATIONAL RESPONSE CENTER EMERGENCY TELEPHONE NUMBERS ARE TO BE USED ONLY IN THE EVENT OF CHEMICAL EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT INVOLVING CHEMICALS. ALL NON-EMERGENCY QUESTIONS SHOULD BE DIRECTED TO CUSTOMER SERVICE (1-800-JTBAKER) FOR ASSISTANCE.

CC IGHT 1991 J.T.BAKER INC.
* TRADEMARKS OF J.T.BAKER INC.

APPROVED BY QUALITY ASSURANCE DEPARTMENT.

August 14, 1991 12:43am Page 10

-- LAST PAGE --

OHS19860

MATERIAL SAFETY DATA SHEET

OCCUPATIONAL HEALTH SERVICES, INC.
11 WEST 42ND STREET, 12TH FLOOR
NEW YORK, NEW YORK 10036
1-800-445-MSDS (1-800-445-6737) OR
1-212-789-3535

FOR EMERGENCY SOURCE INFORMATION
CONTACT: 1-615-366-2000

SUBSTANCE IDENTIFICATION

CAS NUMBER: 78-87-5
RTECS NUMBER: TX9625000

SUBSTANCE: PROPYLENE DICHLORIDE

TRADE NAMES/SYNONYMS:

1,2-DICHLOROPROPANE; DICHLOROPROPANE; ALPHA, BETA-DICHLOROPROPANE;
PROPYLENE CHLORIDE; PROPANE, 1,2-DICHLORO-; ENT 15,406; RCRA U083;
STCC 4909269; UN 1279; C3H7Cl2; OHS19860

CHEMICAL FAMILY:
HALOGEN COMPOUND, ALIPHATIC

MOLECULAR FORMULA: C-H3-C-H2-CL-C-H2-CL

MOLECULAR WEIGHT: 112.99

CERCLA RATINGS (SCALE 0-3): HEALTH=2 FIRE=3 REACTIVITY=0 PERSISTENCE=1
NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=3 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: PROPYLENE DICHLORIDE
CAS# 78-87-5

PERCENT: 100.0

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:

PROPYLENE DICHLORIDE:

75 PPM (347 MG/M3) OSHA TWA; 110 PPM (508 MG/M3) OSHA STEL
75 PPM (347 MG/M3) ACGIH TWA; 110 PPM (508 MG/M3) ACGIH STEL
75 PPM (347 MG/M3) DFG MAK TWA;
375 PPM (1735 MG/M3) DFG MAK 30 MINUTE PEAK, AVERAGE VALUE, 2 TIMES/SHIFT

MEASUREMENT METHOD: CHARCOAL TUBE (PETROLEUM-BASED); ACETONE/CYCLOHEXANE;
GAS CHROMATOGRAPHY WITH ELECTRON CAPTURE DETECTION; (NIOSH VOL. III # 1013,
1,2-DICHLOROPROPANE).

1000 POUNDS CERCLA SECTION 103 REPORTABLE QUANTITY
SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING
SUBJECT TO CALIFORNIA PROPOSITION 65 CANCER AND/OR REPRODUCTIVE TOXICITY
WARNING AND RELEASE REQUIREMENTS- (JANUARY 1, 1990)

PHYSICAL DATA

DESCRIPTION: COLORLESS LIQUID WITH A CHLOROFORM-LIKE ODOR.

BOILING POINT: 205 F (96 C) MELTING POINT: -148 F (-100 C)

SPECIFIC GRAVITY: 1.1560 VOLATILITY: 100%

VAPOR PRESSURE: 39.5 MMHG @ 20 C EVAPORATION RATE: (BUTYL ACETATE=1) >1

SOLUBILITY IN WATER: 0.26% @ 20 C ODOR THRESHOLD: 50 PPM

VAPOR DENSITY: 3.9

SOLVENT SOLUBILITY: SOLUBLE IN ALCOHOL, ETHER, BENZENE, CHLOROFORM, CARBON TETRACHLORIDE, MOST ORGANIC SOLVENTS.

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:

DANGEROUS FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL A CONSIDERABLE DISTANCE TO A SOURCE OF IGNITION AND FLASH BACK.

VAPOR-AIR MIXTURES ARE EXPLOSIVE.

FLASH POINT: 60 F (16 C) (CC) UPPER EXPLOSIVE LIMIT: 14.5%

LOWER EXPLOSIVE LIMIT: 3.4% AUTOIGNITION TEMP.: 1035 F (557 C)

FLAMMABILITY CLASS(OSHA): IB

FIREFIGHTING MEDIA:

DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR REGULAR FOAM
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FIREFIGHTING:

MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT WITHOUT RISK. APPLY COOLING WATER TO SIDES OF CONTAINERS THAT ARE EXPOSED TO FLAMES UNTIL WELL AFTER FIRE IS OUT. STAY AWAY FROM ENDS OF TANKS. FOR MASSIVE FIRE IN CARGO AREA, USE UNMANNED HOSE HOLDER OR MONITOR NOZZLES; IF THIS IS IMPOSSIBLE, WITHDRAW FROM AREA AND LET FIRE BURN. WITHDRAW IMMEDIATELY IN CASE OF RISING SOUND FROM VENTING SAFETY DEVICE OR ANY DISCOLORATION OF TANK DUE TO FIRE. ISOLATE FOR 1/2 MILE IN ALL DIRECTIONS IF TANK, RAIL CAR OR TANK TRUCK IS INVOLVED IN FIRE (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5, GUIDE PAGE 27).

EXTINGUISH ONLY IF FLOW CAN BE STOPPED; USE WATER IN FLOODING QUANTITIES AS FOG, SOLID STREAMS MAY SPREAD FIRE. COOL CONTAINERS WITH FLOODING QUANTITIES

OF WATER, APPLY FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING HAZARDOUS VAPORS, KEEP UPWIND.

WATER MAY BE INEFFECTIVE EXCEPT AS A BLANKET (NFPA 325M, FIRE HAZARD PROPERTIES OF FLAMMABLE LIQUIDS, GASES, AND VOLATILE SOLIDS, 1984)

TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49 CFR 172.101:
FLAMMABLE LIQUID

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49 CFR 172.101 AND
SUBPART E:
FLAMMABLE LIQUID

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: 49 CFR 173.119
EXCEPTIONS: 49 CFR 173.118

FINAL RULE ON HAZARDOUS MATERIALS REGULATIONS (HMR, 49 CFR PARTS 171-180),
DOCKET NUMBERS HM-181, HM-181A, HM-181B, HM-181C, HM-181D AND HM-204.
EFFECTIVE DATE OCTOBER 1, 1991. HOWEVER, COMPLIANCE WITH THE REGULATIONS IS
AUTHORIZED ON AND AFTER JANUARY 1, 1991. (55 FR 52402, 12/21/90)

EXCEPT FOR EXPLOSIVES, INHALATION HAZARDS, AND INFECTIOUS SUBSTANCES, THE
EFFECTIVE DATE FOR HAZARD COMMUNICATION REQUIREMENTS IS EXTENDED TO
OCTOBER 1, 1993. (56 FR 47158, 10/18/91)

U.S. DEPARTMENT OF TRANSPORTATION SHIPPING NAME-ID NUMBER, 49 CFR 172.101:
PROPYLENE DICHLORIDE-UN 1279

U.S. DEPARTMENT OF TRANSPORTATION HAZARD CLASS OR DIVISION, 49 CFR 172.101:
3 - FLAMMABLE LIQUID

U.S. DEPARTMENT OF TRANSPORTATION PACKING GROUP, 49 CFR 172.101:
PG II

U.S. DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS, 49 CFR 172.101
AND SUBPART E:
FLAMMABLE LIQUID

U.S. DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS:
EXCEPTIONS: 49 CFR 173.150
NON-BULK PACKAGING: 49 CFR 173.202
BULK PACKAGING: 49 CFR 173.242

U.S. DEPARTMENT OF TRANSPORTATION QUANTITY LIMITATIONS 49 CFR 172.101:
PASSENGER AIRCRAFT OR RAILCAR: 5 L
CARGO AIRCRAFT ONLY: 60 L

TOXICITY

PROPYLENE DICHLORIDE:

IRRITATION DATA: 500 MG EYE-RABBIT MILD.
 TOXICITY DATA: 14 GM/M3/8 HOURS INHALATION-RAT LC50; 1000 PPM/2 HOURS
 INHALATION-MOUSE LCLO; 8750 MG/KG SKIN-RABBIT LD50; 1947 MG/KG ORAL-RAT
 LD50; 860 MG/KG ORAL-MOUSE LD50; 5000 MG/KG ORAL-DOG LDLO; 2 GM/KG
 ORAL-GUINEA PIG LD50; 960 MG/KG UNREPORTED-MOUSE LD50; MUTAGENIC DATA
 (RTECS); TUMORIGENIC DATA (RTECS).
 CARCINOGEN STATUS: ANIMAL LIMITED EVIDENCE (IARC GROUP-3). A DOSE-RELATED
 INCREASE IN THE INCIDENCE OF HEPATOCELLULAR TUMORS WAS OBSERVED IN MALE
 AND FEMALE MICE AFTER ORAL ADMINISTRATION OF PROPYLENE DICHLORIDE.
 LOCAL EFFECTS: IRRITANT- INHALATION, EYE.
 ACUTE TOXICITY LEVEL: TOXIC BY INHALATION; MODERATELY TOXIC BY INGESTION;
 SLIGHTLY TOXIC BY DERMAL ABSORPTION.
 TARGET EFFECTS: CENTRAL NERVOUS SYSTEM DEPRESSANT; HEPATOTOXIN; NEPHROTOXIN.
 POISONING MAY ALSO AFFECT THE LUNGS AND HEART.
 AT INCREASED RISK FROM EXPOSURE: PERSONS WITH PRE-EXISTING SKIN, LIVER, OR
 KIDNEY DISEASE, OR IMPAIRED PULMONARY FUNCTION.
 ADDITIONAL DATA: ALCOHOL MAY ENHANCE THE TOXIC EFFECTS.

HEALTH EFFECTS AND FIRST AID

INHALATION:

PROPYLENE DICHLORIDE:

IRRITANT/NARCOTIC/NEPHROTOXIN/HEPATOTOXIN/TOXIC.

2000 PPM IMMEDIATELY DANGEROUS TO LIFE OR HEALTH.

ACUTE EXPOSURE- INHALATION MAY CAUSE MUCOUS MEMBRANE IRRITATION WITH SORE
 THROAT AND COUGHING. ABDOMINAL PAIN, NAUSEA, VOMITING, ANOREXIA,
 HEMATURIA, AND ECCHYMOSES, POSSIBLY DELAYED UP TO 24 HOURS, MAY OCCUR.
 HIGH CONCENTRATIONS MAY CAUSE CENTRAL NERVOUS SYSTEM DEPRESSION
 WITH HEADACHE, DIZZINESS, DROWSINESS, AND INCOORDINATION. ANIMAL STUDIES
 REPORT SEVERE CENTRILOBULAR LIVER DAMAGE, ACUTE RENAL FAILURE, HEMOLYTIC
 ANEMIA, ADRENAL INJURY, MARKED VISCERAL CONGESTION, DISSEMINATED
 INTRAVASCULAR COAGULATION, FATTY DEGENERATION AND NECROSIS OF THE HEART,
 AND DEATH. IN MICE, DEATH WAS PRIMARILY DUE TO OBSTRUCTIVE RESPIRATORY
 FAILURE.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE SEVERE LIVER AND
 KIDNEY INJURY. IN ANIMAL STUDIES, DECREASED WEIGHT GAIN, WEAKNESS,
 GENERAL DEBILITY, DEGENERATION OF OLFACTORY TISSUES, RESPIRATORY
 HYPERPLASIA, ANEMIA, AND DELAYED DEATH HAVE BEEN REPORTED. HEPATOMAS
 WERE NOTED IN SOME SURVIVORS OF ONE STRAIN OF MICE EXPOSED AT 400 PPM.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING
 HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. MAINTAIN AIRWAY AND BLOOD
 PRESSURE AND ADMINISTER OXYGEN IF AVAILABLE. KEEP AFFECTED PERSON WARM AND
 AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. ADMINISTRATION OF OXYGEN
 SHOULD BE PERFORMED BY QUALIFIED PERSONNEL. GET MEDICAL ATTENTION
 IMMEDIATELY.

SKIN CONTACT:

PROPYLENE DICHLORIDE:

ACUTE EXPOSURE- CONTACT WITH THE LIQUID HAS PRODUCED ONLY MILD IRRITATION.
 HOWEVER, OCCLUDED CONTACT MAY RESULT IN MORE SEVERE IRRITATION. ANIMAL
 STUDIES INDICATE THAT LETHAL AMOUNTS MAY BE ABSORBED THROUGH INTACT

SKIN.

CHRONIC EXPOSURE- REPEATED CONTACT WITH THE LIQUID MAY CAUSE DERMATITIS DUE TO THE DEFATTING ACTION ON THE SKIN.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:

PROPYLENE DICHLORIDE:

IRRITANT.

ACUTE EXPOSURE- VAPORS MAY CAUSE IRRITATION. HUMAN CONTACT WITH THE LIQUID PRODUCED SMARTING THAT PERSISTED FOR SEVERAL HOURS AND DAMAGE OF THE CORNEAL EPITHELIUM THAT HEALED PROMPTLY. HOWEVER, IN RABBIT EYES, THE LIQUID WAS MODERATELY INJURIOUS PRODUCING SOME PAIN AND IRRITATION, BUT NO SERIOUS OR PERMANENT INJURY. GUINEA PIGS EXPOSED TO 2200 PPM FOR 7 HOURS EXHIBITED LACRIMATION AND SWELLING OF THE EYELIDS AND CONJUNCTIVA, AND DISCOLORATION AND INFECTION OF THE CORNEAS. RABBITS EXPOSED TO THE SAME CONDITIONS SHOWED LITTLE IRRITATION.

CHRONIC EXPOSURE- REPEATED OR PROLONGED CONTACT WITH IRRITANTS MAY CAUSE CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:

PROPYLENE DICHLORIDE:

NARCOTIC/NEPHROTOXIN/HEPATOTOXIN/LIMITED ANIMAL CARCINOGEN.

ACUTE EXPOSURE- MAY CAUSE IRRITATION OF THE ORAL MUCOUS MEMBRANES, ABDOMINAL PAIN, NAUSEA, VOMITING, DIARRHEA, CENTRAL NERVOUS SYSTEM DEPRESSION WITH HEADACHE, DROWSINESS, UNCONSCIOUSNESS, AND POSSIBLY LIVER AND KIDNEY DAMAGE. ACCIDENTAL INGESTION OF 50 ML PRODUCED COMA AND HYPERTONIA WITHIN 2 HOURS FOLLOWED BY ACUTE DELIRIUM, HEPATIC FAILURE AND DEATH AT 36 HOURS. OTHER EFFECTS AS DETAILED IN ACUTE INHALATION MAY OCCUR.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE SEVERE LIVER DAMAGE AND DEATH. ANIMAL STUDIES AT HIGH DOSES INDICATE AN INCREASED INCIDENCE OF CLEAR CELL CHANGES. NECROSIS AND ADENOMAS OF THE LIVER, AND DOSE RELATED INCREASES OF ADENOCARCINOMA OF THE MAMMARY GLANDS.

FIRST AID- IF THE PERSON IS CONSCIOUS AND NOT CONVULSING, REMOVE BY GIVING SYRUP OF IPECAC (IF VOMITING OCCURS, KEEP THE HEAD BELOW THE HIPS TO PREVENT ASPIRATION). GIVE ACTIVATED CHARCOAL FOLLOWED BY GASTRIC LAVAGE. FOLLOW WITH A SALINE CATHARTIC. DO NOT GIVE FATS OR OILS. INTESTINAL LAVAGE WITH 20% MANNITOL (200 ML) BY STOMACH TUBE IS ALSO USEFUL. GIVE ARTIFICIAL RESPIRATION WITH OXYGEN IF RESPIRATION IS DEPRESSED (DREISBACH, HANDBOOK OF POISONING, 12TH ED.). TREAT SYMPTOMATICALLY AND SUPPORTIVELY. LAVAGE AND ADMINISTRATION OF OXYGEN SHOULD BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL. GET MEDICAL ATTENTION IMMEDIATELY.

ANTIDOTE:

NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

REACTIVITY:

STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:

PROPYLENE DICHLORIDE:

ACIDS: POSSIBLE VIGOROUS REACTION.

ALKALIES: POSSIBLE VIGOROUS REACTION.

ALUMINUM: POSSIBLE VIOLENT REACTION, PARTICULARLY IN A CLOSED SYSTEM.

METALS: POSSIBLE VIGOROUS REACTION.

OXIDIZERS (STRONG): FIRE AND EXPLOSION HAZARD.

PLASTICS, RUBBER, AND COATINGS: MAY BE ATTACKED.

DECOMPOSITION:

THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE HIGHLY TOXIC FUMES OF PHOSGENE, TOXIC AND CORROSIVE FUMES OF CHLORIDES, AND OXIDES OF CARBON.

POLYMERIZATION:

HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

****STORAGE****

STORE IN ACCORDANCE WITH 29 CFR 1910.106.

BONDING AND GROUNDING: SUBSTANCES WITH LOW ELECTROCONDUCTIVITY, WHICH MAY BE IGNITED BY ELECTROSTATIC SPARKS, SHOULD BE STORED IN CONTAINERS WHICH MEET THE BONDING AND GROUNDING GUIDELINES SPECIFIED IN NFPA 77-1983, RECOMMENDED PRACTICE ON STATIC ELECTRICITY.

PROTECT AGAINST PHYSICAL DAMAGE. OUTSIDE OR DETACHED STORAGE IS PREFERRED. INSIDE STORAGE SHOULD BE IN A STANDARD FLAMMABLE LIQUIDS STORAGE ROOM. SEPARATE FROM OXIDIZING MATERIALS (NFPA 49, HAZARDOUS CHEMICALS DATA, 1975).

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

****DISPOSAL****

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40CFR 262. EPA HAZARDOUS WASTE NUMBER U083.

CONDITIONS TO AVOID

AVOID CONTACT WITH HEAT, SPARKS, FLAMES, OR OTHER SOURCES OF IGNITION. VAPORS MAY BE EXPLOSIVE. AVOID OVERHEATING OF CONTAINERS; CONTAINERS MAY VIOLENTLY RUPTURE IN HEAT OF FIRE. AVOID CONTAMINATION OF WATER SOURCES.

SPILL AND LEAK PROCEDURES

SOIL SPILL:

DIG A HOLDING AREA SUCH AS A PIT, POND OR LAGOON TO CONTAIN SPILL AND DIKE SURFACE FLOW USING BARRIER OF SOIL, SANDBAGS, FOAMED POLYURETHANE OR FOAMED CONCRETE. ABSORB LIQUID MASS WITH FLY ASH OR CEMENT POWDER.

DIMINISH VAPOR AND FIRE HAZARD BY APPLICATION OF APPROPRIATE FOAM.

AIR SPILL:

APPLY WATER SPRAY TO KNOCK DOWN AND REDUCE VAPORS. KNOCK-DOWN WATER IS CORROSIVE AND TOXIC AND SHOULD BE DIKED FOR CONTAINMENT.

WATER SPILL:

TRAP SPILLED MATERIAL AT BOTTOM IN DEEP WATER POCKETS, EXCAVATED HOLDING AREAS OR WITHIN SAND BAG BARRIERS.

USE SUCTION HOSES TO REMOVE TRAPPED SPILL MATERIAL.

USE MECHANICAL DREDGES OR LIFTS TO EXTRACT IMMOBILIZED MASSES OF POLLUTION PRECIPITATES.

THE CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986 (PROPOSITION 65) PROHIBITS CONTAMINATING ANY KNOWN SOURCE OF DRINKING WATER WITH SUBSTANCES KNOWN TO CAUSE CANCER AND/OR REPRODUCTIVE TOXICITY.

OCCUPATIONAL SPILL:

SHUT OFF IGNITION SOURCES. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. NO SMOKING, FLAMES OR FLARES IN HAZARD AREA. KEEP UNNECESSARY PEOPLE AWAY; ISOLATE HAZARD AREA AND RESTRICT ENTRY.

REPORTABLE QUANTITY (RQ): 1000 POUNDS

THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

PROTECTIVE EQUIPMENT

VENTILATION:

PROVIDE LOCAL EXHAUST OR PROCESS ENCLOSURE VENTILATION TO MEET THE PUBLISHED EXPOSURE LIMITS. VENTILATION EQUIPMENT MUST BE EXPLOSION-PROOF.

RESPIRATOR:

THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO CHEMICAL HAZARDS; NIOSH CRITERIA DOCUMENTS OR BY THE U.S. DEPARTMENT OF LABOR, 29 CFR 1910 SUBPART Z.

THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

PROPYLENE DICHLORIDE:

AT ANY DETECTABLE CONCENTRATION:

ANY SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE AND OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ESCAPE- ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR (GAS MASK) WITH A CHIN-STYLE OR FRONT- OR BACK-MOUNTED ORGANIC VAPOR CANISTER.
ANY APPROPRIATE ESCAPE-TYPE SELF-CONTAINED BREATHING APPARATUS.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

CLOTHING:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT ANY POSSIBILITY OF SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:

EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE.

EMERGENCY WASH FACILITIES:

WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES AND/OR SKIN MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN AND QUICK DRENCH SHOWER WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED BY- OCCUPATIONAL HEALTH SERVICES, INC.
CREATION DATE: 03/08/85 REVISION DATE: 10/29/91

OHS19860

78-87-5

PROPYLENE DICHLORIDE

Copyright 1991 Occupational Health Services, Inc. All Rights Reserved.
Licensed to: fluor daniel inc.
To make unlimited paper copies for internal distribution and use only.

L5 ANSWER 1 OF 1

*
* MSDS Canadian Centre for Occupational Health and Safety *
*

AN 142884 MSDS-CCOHS

PRODUCT NAME(S): ***STYRENE***

PRODUCT IDENTIFICATION: PRODUCT CODE C-328
MSDS NUMBER C-15

MANUFACTURER(S): FIBERGLAS CANADA INC
4100 YONGE STREET
WILLOWDALE ONTARIO
CANADA M2P 2B6

Emergency Telephone: 416-221-8931

DATE OF MSDS: 1 Jun 1989

MATERIAL SAFETY DATA SHEET

SHEET 1 OF 2

PRODUCT CODE : C-328

SECTION 1 : PRODUCT INFORMATION

PRODUCT NAME : STYRENE

MANUFACTURER : FIBERGLAS CANADA INC. EMERGENCY PHONE NO.
4100 YONGE STREET
WILLOWDALE ONT M2P 2B6 416-221-8931

PRIMARY COMPONENTS : STYRENE SOLUTION WHICH MAY CONTAIN NON CONTROLLED
ADDITIVES.

SECTION 2 : HAZARDOUS INGREDIENTS

	CAS NUMBER	LD50 ORAL-RAT	%	TLV(UNITS)
STYRENE (INHIBITED)	100-42-5	5000 MG.KG	60-100	50 PPM

SECTION 3 : PHYSICAL DATA

BOILING POINT(C)	: -145	VAP DENSITY(AIR=1)	: 3.6
VAP PRESS(MMHG@20C):	-4.5	SOLUBILITY IN WATER	: 0.03%

SPECIFIC GRAVITY : 0.907 % VOLATILE BY VOL : 60-100
 PHYSICAL STATE : LIQUID
 COLOUR AND ODOUR : AROMATIC ODOUR

SECTION 4 : FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (C) : 31 DEG.C (C.C.)
 FLAMMABLE LIMITS : STYRENE - L.F.L. 1.1% : U.F.L. 6.1%
 EXTINGUISHING MEDIA: DRY CHEMICAL, FOAM OR CARBON DIOXIDE.
 FIRE FIGHTING EQUIP: USE OF SELF-CONTAINED BREATHING APPARATUS IS RECOMMENDED
 FIRE & EXPLOSION : VAPOUR FORMS EXPLOSIVE MIXTURE WITH AIR. VAPOUR IS
 HAZARD : HEAVIER THAN AIR AND MAY TRAVEL CONSIDERABLE DISTANCE TO
 A SOURCE OF IGNITION AND FLASH BACK.

SECTION 5 : REACTIVITY DATA

STABILITY : STABLE UNDER NORMAL CONDITIONS.
 COND'T TO AVOID: HEAT
 INCOMPATIBILITY : OXIDIZING MATERIAL, ACID, BASE AND ALUMINUM CHLORIDE.
 DECOMPOSITION PRODS: ACRID FUMES, CARBON DIOXIDE, CARBON MONOXIDE AND SMOKE.
 POLYMERIZATION : HAZARDOUS POLYMERIZATION MAY OCCUR.
 COND'T TO AVOID: ELEVATED TEMPERATURES.

MATERIAL SAFETY DATA SHEET

SHEET 2 OF 2

PRODUCT CODE : C-328

SECTION 6 : TOXICOLOGICAL PROPERTIES

ORAL INGESTION : CAN CAUSE PRONOUNCED IRRITATION OF THE MOUTH, ESOPHAGUS
 AND STOMACH.
 EYE CONTACT : VAPOUR CAUSES TRANSIENT IRRITATION, LIQUID MAY CAUSE
 MODERATE IRRITATION.
 SKIN CONTACT : MODERATELY IRRITATING, PROLONGED OR REPEATED CONTACT MAY
 CAUSE DRYING OF SKIN.
 SKIN ABSORPTION : REPEATED OR PROLONGED SKIN EXPOSURE MAY RESULT IN
 ABSORPTION OF HARMFUL AMOUNTS OF STYRENE.
 INHALATION : TLV OF 50 PPM FOR STYRENE.
 OVEREXPOSURE EFFECT: DROWSINESS; WEAK, UNSTEADY GAIT; NARCOSIS.
 CHRONIC TOXICITY : THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER (IARC)
 HAS CLASSIFIED STYRENE AS "POSSIBLY CARCINOGENIC
 TO HUMANS".

SECTION 7 : FIRST AID MEASURES

SKIN CONTACT : WASH WITH SOAP AND WATER.
 EYE CONTACT : FLUSH EYES WITH FLOWING WATER FOR 15 MINUTES. IF IRRITATION
 PERSISTS, OBTAIN MEDICAL ATTENTION.
 INGESTION : DO NOT INDUCE VOMITING. OBTAIN MEDICAL ATTENTION.
 INHALATION : REMOVE VICTIM TO FRESH AIR. GIVE OXYGEN OR ARTIFICIAL
 RESPIRATION AS NECESSARY. OBTAIN MEDICAL ATTENTION.

SECTION 8 : PREVENTIVE MEASURES

VENTILATION : USE WITH ADEQUATE VENTILATION.
 RESPIRATORY : IF TLV EXCEEDED OR RESPIRATORY IRRITATION OCCURS, USE

PROTECTION A CSA APPROVED ORGANIC VAPOUR RESPIRATOR.
PROTECTIVE CLOTHING: USE OF IMPERVIOUS GLOVES AND APRON RECOMMENDED IF
CONTACT IS POSSIBLE.
EYE PROTECTION : USE OF SAFETY GLASSES IS RECOMMENDED.
OTHER PROTECT EQUIP: EYE FOUNTAIN AND SAFETY SHOWER RECOMMENDED.
SPILL PROCEDURE : SOAK UP WITH INERT MATERIAL. WASH AREA WITH DETERGENT
AND WATER.
DISPOSAL METHOD : DISPOSE OF IN ACCORDANCE WITH LOCAL REGULATIONS.

SECTION 9 : SPECIAL PRECAUTIONS OR OTHER COMMENTS

HANDLING & STORING : STORE CLOSED CONTAINERS IN A DRY COOL AREA AWAY
FROM SOURCES OF IGNITION.
WHMIS CLASSIFICATION : B.2. FLAMMABLE LIQUID
D.2.A. POSSIBLE CARCINOGEN
F. DANGEROUSLY REACTIVE MATERIAL
T D G SHIPPING NAME : STYRENE MONOMER, INHIBITED SOLUTION
FLAMMABLE LIQUID 3.3 (9.2) UN2055 PKG. GR. II

SECTION 10 : PREPARATION INFORMATION

DATE	SHEET NO
MAY 31, 1989 INDUSTRIAL HYGIENE GROUP - 519-336-5670 OCCUPATIONAL HEALTH AND SAFETY GROUP - 416-733-1600	C-15

THE INFORMATION HEREIN IS GIVEN IN GOOD FAITH
BUT NO WARRANTY, EXPRESS OR IMPLIED, IS MADE.

OHS26400

MATERIAL SAFETY DATA SHEET

OCCUPATIONAL HEALTH SERVICES, INC.
11 WEST 42ND STREET, 12TH FLOOR
NEW YORK, NEW YORK 10036
1-800-445-MSDS (1-800-445-6737) OR
1-212-789-3535

FOR EMERGENCY SOURCE INFORMATION
CONTACT: 1-615-366-2000

SUBSTANCE IDENTIFICATION

CAS NUMBER: 79-34-5
RTECS NUMBER: KI8575000

SUBSTANCE: 1,1,2,2-TETRACHLOROETHANE

TRADE NAMES/SYNONYMS:

S-TETRACHLOROETHANE; ACETYLENE TETRACHLORIDE; SYM-TETRACHLOROETHANE;
1,1-DICHLORO-2,2-DICHLOROETHANE; ETHANE, 1,1,2,2-TETRACHLORO-;
TETRACHLOROETHANE; SYMMETRICAL TETRACHLOROETHANE; CELLON; BONOFORM;
STCC 4940354; RCRA U209; UN 1702; C2H2CL4; OHS26400

CHEMICAL FAMILY:

HALOGEN COMPOUND, ALIPHATIC

MOLECULAR FORMULA: C-H-CL2-C-H-CL2

MOLECULAR WEIGHT: 167.85

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=1 REACTIVITY=0 PERSISTENCE=3
NFPRA RATINGS (SCALE 0-4): HEALTH=2 FIRE=1 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: 1,1,2,2-TETRACHLOROETHANE
CAS# 79-34-5

PERCENT: 100.0

OTHER CONTAMINANTS: NONE.

EXPOSURE LIMITS:

1,1,2,2-TETRACHLOROETHANE:

- 1 PPM (7 MG/M3) OSHA TWA (SKIN)
- 1 PPM (7 MG/M3) ACGIH TWA (SKIN)
- 1 PPM (7 MG/M3) NIOSH RECOMMENDED TWA (SKIN)
- 1 PPM (7 MG/M3) DFG MAK TWA (SKIN)

MEASUREMENT METHOD: CHARCOAL TUBE (PETROLEUM BASED); CARBON DISULFIDE; GAS
CHROMATOGRAPHY WITH FLAME IONIZATION DETECTION; (NIOSH VOL. III # 1019).

100 POUNDS CERCLA SECTION 103 REPORTABLE QUANTITY
SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING
SUBJECT TO CALIFORNIA PROPOSITION 65 CANCER AND/OR REPRODUCTIVE TOXICITY
WARNING AND RELEASE REQUIREMENTS-(JULY 1, 1990)

PHYSICAL DATA

DESCRIPTION: COLORLESS TO PALE YELLOW, MOBILE, HEAVY LIQUID WITH A MILD, SWEET, CHLOROFORM-LIKE ODOR. BOILING POINT: 295 F (146 C)
MELTING POINT: -33 F (-36 C) SPECIFIC GRAVITY: 1.6953 VOLATILITY: 100%
VAPOR PRESSURE: 8 MMHG @ 20 C EVAPORATION RATE: (BUTYL ACETATE=1) 0.65
SOLUBILITY IN WATER: 0.28% @ 25 C ODOR THRESHOLD: <3 PPM
VAPOR DENSITY: 5.79
SOLVENT SOLUBILITY: SOLUBLE IN METHANOL, ETHANOL, BENZENE, ACETONE, ETHER, CHLOROFORM, CARBON TETRACHLORIDE, PETROLEUM ETHER, DIMETHYLFORMAMIDE, CARBON DISULFIDE, OILS.
VISCOSITY: 1.7 CPS @ 20 C

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
SLIGHT FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

FIREFIGHTING MEDIA:
DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR REGULAR FOAM
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FIREFIGHTING:
MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT WITHOUT RISK. DO NOT SCATTER SPILLED MATERIAL WITH HIGH-PRESSURE WATER STREAMS. DIKE FIRE-CONTROL WATER FOR LATER DISPOSAL (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5, GUIDE PAGE 31).

USE AGENTS SUITABLE FOR TYPE OF SURROUNDING FIRE. AVOID BREATHING HAZARDOUS VAPORS, KEEP UPWIND.

TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49 CFR 172.101:
ORM-A

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49 CFR 172.101 AND SUBPART E:
NONE

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: 49 CFR 173.620
EXCEPTIONS: 49 CFR 173.505

FINAL RULE ON HAZARDOUS MATERIALS REGULATIONS (HMR, 49 CFR PARTS 171-180),
DOCKET NUMBERS HM-181, HM-181A, HM-181B, HM-181C, HM-181D AND HM-204.
EFFECTIVE DATE OCTOBER 1, 1991. HOWEVER, COMPLIANCE WITH THE REGULATIONS IS
AUTHORIZED ON AND AFTER JANUARY 1, 1991. (55 FR 52402, 12/21/90)

EXCEPT FOR EXPLOSIVES, INHALATION HAZARDS, AND INFECTIOUS SUBSTANCES, THE
EFFECTIVE DATE FOR HAZARD COMMUNICATION REQUIREMENTS IS EXTENDED TO
OCTOBER 1, 1993. (56 FR 47158, 10/18/91)

U.S. DEPARTMENT OF TRANSPORTATION SHIPPING NAME-ID NUMBER, 49 CFR 172.101:
TETRAACHLOROETHANE-UN 2504

U.S. DEPARTMENT OF TRANSPORTATION HAZARD CLASS OR DIVISION, 49 CFR 172.101:
6.1 - POISONOUS MATERIALS

U.S. DEPARTMENT OF TRANSPORTATION PACKING GROUP, 49 CFR 172.101:
PG II

U.S. DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS, 49 CFR 172.101
AND SUBPART E:
POISON

U.S. DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS:
EXCEPTIONS: NONE
NON-BULK PACKAGING: 49 CFR 173.202
BULK PACKAGING: 49 CFR 173.243

U.S. DEPARTMENT OF TRANSPORTATION QUANTITY LIMITATIONS 49 CFR 172.101:
PASSENGER AIRCRAFT OR RAILCAR: 5 L
CARGO AIRCRAFT ONLY: 60 L

TOXICITY

1,1,2,2-TETRACHLOROETHANE:

TOXICITY DATA: 1000 MG/M3/30 MINUTES INHALATION-HUMAN TCLO; 1000 PPM/4 HOURS
INHALATION-RAT LCLO; 4500 MG/M3/2 HOURS INHALATION-MOUSE LC50;
19 GM/M3/45 MINUTES INHALATION-CAT LCLO; 30 MG/KG ORAL-HUMAN TDLO;
800 MG/KG ORAL-RAT LD50; 300 MG/KG ORAL-DOG LDLO; 1108 MG/KG
SUBCUTANEOUS-MOUSE LD50; 500 MG/KG SUBCUTANEOUS-RABBIT LDLO;
50 MG/KG INTRAVENOUS-DOG LDLO; 30 MG/KG INTRAPERITONEAL-MOUSE LDLO;
MUTAGENIC DATA (RTECS); TUMORIGENIC DATA (RTECS).
CARCINOGEN STATUS: HUMAN INADEQUATE EVIDENCE; ANIMAL LIMITED EVIDENCE (IARC
GROUP-3). ORAL ADMINISTRATION PRODUCED HEPATOCELLULAR CARCINOMAS IN MALE AND
FEMALE MICE.
LOCAL EFFECTS: IRRITANT- INHALATION, SKIN, EYES.
ACUTE TOXICITY LEVEL: TOXIC BY INHALATION; MODERATELY TOXIC BY INGESTION.
TARGET EFFECTS: CENTRAL NERVOUS SYSTEM DEPRESSANT; HEPATOTOXIN. POISONING MAY
ALSO AFFECT THE KIDNEYS AND BLOOD.
ADDITIONAL DATA: ALCOHOLIC BEVERAGES ENHANCE THE SYSTEMIC TOXICITY.

HEALTH EFFECTS AND FIRST AID

INHALATION:

1,1,2,2-TETRACHLOROETHANE:

IRRITANT/NARCOTIC/HEPATOTOXIC/TOXIC.

ACUTE EXPOSURE- THE INITIAL SYMPTOMS OF EXPOSURE MAY BE IRRITATION OF THE UPPER RESPIRATORY TRACT AND SALIVATION. INDUSTRIAL EXPOSURE TO 116-335 PPM FOR 20 MINUTES OR LESS PRODUCED DIZZINESS, NAUSEA AND VOMITING, ABDOMINAL PAIN, SIGNS OF LIVER INJURY, TREMORS OF THE FINGERS, AND FATIGUE. OTHER SYMPTOMS MAY INCLUDE COUGHING, SHORTNESS OF BREATH, EXCESSIVE SWEATING, CARDIAC IRREGULARITIES AND CENTRAL NERVOUS SYSTEM EFFECTS SUCH AS DIZZINESS, HEADACHE, IRRITABILITY, NERVOUSNESS, HALLUCINATIONS, DISTORTED PERCEPTIONS, INSOMNIA, PARESTHESIAS, TREMORS AND POSSIBLE DEATH FROM RESPIRATORY PARALYSIS. MORE SEVERE EXPOSURES MAY RESULT IN LIVER DYSFUNCTION WITH ENLARGEMENT, TENDERNESS AND JAUNDICE. ACCOMPANYING SYMPTOMS MAY INCLUDE GENERAL MALAISE, DROWSINESS, LOSS OF APPETITE, UNPLEASANT TASTE, ABDOMINAL DISCOMFORT, MENTAL CONFUSION, STUPOR OR DELIRIUM, HEMATEMESIS, CONVULSIONS, AND PURPURIC RASH. HEPATIC NECROSIS PROGRESSING TO CIRRHOSIS MAY OCCUR. SEVERE CASES MAY RESULT IN NEPHRITIS AND THE URINE MAY CONTAIN ALBUMIN AND CASTS. OLIGURIA AND HEMATURIA HAVE ALSO BEEN REPORTED. DELAYED DISCOLORATION OF THE SKIN MAY BE POSSIBLE FOLLOWED BY UNCONSCIOUSNESS, COMA AND DEATH. BLOOD CHANGES INCLUDING INCREASES IN MONONUCLEAR LEUKOCYTES, PROGRESSIVE ANEMIA, AND A SLIGHT THROMBOCYTOSIS MAY OCCUR. INTOXICATION MAY ALSO CAUSE PERIPHERAL NEURITIS WITH ACCOMPANYING DISAPPEARANCE OF OCULAR AND PHARYNGEAL REFLEXES. PATHOLOGICAL FINDINGS MAY INCLUDE CEREBRAL EDEMA, PULMONARY CONGESTION, PULMONARY EDEMA WITH HEMORRHAGE AND LIVER AND KIDNEY DAMAGE. FATTY DEGENERATION OF THE MYOCARDIUM HAS BEEN REPORTED IN ANIMALS.

CHRONIC EXPOSURE- REPEATED AND PROLONGED EXPOSURE MAY CAUSE CENTRAL NERVOUS SYSTEM AND HEPATIC SYMPTOMS AS INDICATED IN ACUTE EXPOSURE. REPRODUCTIVE EFFECTS HAVE BEEN REPORTED IN ANIMALS.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. MAINTAIN AIRWAY AND BLOOD PRESSURE AND ADMINISTER OXYGEN IF AVAILABLE. KEEP AFFECTED PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. ADMINISTRATION OF OXYGEN SHOULD BE PERFORMED BY QUALIFIED PERSONNEL. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:

1,1,2,2-TETRACHLOROETHANE:

IRRITANT.

ACUTE EXPOSURE- CONTACT WITH THE SUBSTANCE MAY CAUSE IMMEDIATE IRRITATION, REDNESS AND SKIN LESIONS. MAY BE READILY ABSORBED THROUGH THE SKIN. IF SUFFICIENT AMOUNTS ARE ABSORBED, SYSTEMIC TOXICITY MAY OCCUR AS DETAILED IN ACUTE INHALATION. CHLORINATED HYDROCARBONS MAY PRODUCE IRRITANT ALLERGIC AND ACNEIFORM ERUPTIONS.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE MAY CAUSE DERMATITIS WITH DRYNESS, SCALING, INFLAMMATION, PURPURIC RASH AND OTHER SYMPTOMS AS DETAILED IN CHRONIC INHALATION. IN RARE CASES THE DERMATITIS MAY BE CAUSED BY HYPERSENSITIVITY TO THE SUBSTANCE.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:

1,1,2,2-TETRACHLOROETHANE:
IRRITANT.

ACUTE EXPOSURE- MAY CAUSE IRRITATION, LACRIMATION AND A BURNING SENSATION. SPLASHED LIQUID MAY CAUSE SERIOUS EYE DAMAGE.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE TO IRRITANTS MAY CAUSE CONJUNCTIVITIS.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:

1,1,2,2-TETRACHLOROETHANE:
NARCOTIC/HEPATOTOXIN/LIMITED ANIMAL CARCINOGEN.

ACUTE EXPOSURE- INGESTION OF 3 MILLILITERS CAUSED COMA OR IMPAIRED CONSCIOUSNESS IN HUMANS. IF SUFFICIENT AMOUNTS ARE INGESTED, SYSTEMIC TOXICITY MAY OCCUR AS DETAILED IN ACUTE INHALATION.

CHRONIC EXPOSURE- REPEATED ADMINISTRATION RESULTED IN AN INCREASED INCIDENCE OF HEPATOCELLULAR CARCINOMAS IN MICE BUT NOT RATS.

FIRST AID- REMOVE BY GASTRIC LAVAGE OR EMESIS. MAINTAIN BLOOD PRESSURE AND AIRWAY. GIVE OXYGEN IF RESPIRATION IS DEPRESSED. DO NOT PERFORM GASTRIC LAVAGE OR EMESIS IF VICTIM IS UNCONSCIOUS. GET MEDICAL ATTENTION IMMEDIATELY (DREISBACH, HANDBOOK OF POISONING, 12TH ED.). ADMINISTRATION OF GASTRIC LAVAGE OR OXYGEN SHOULD BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL.

ANTIDOTE:

NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

REACTIVITY:

STABLE UNDER NORMAL TEMPERATURES AND PRESSURES. MAY DECOMPOSE SLOWLY ON EXPOSURE TO LIGHT AND AIR TO TRICHLOROETHYLENE AND PHOSGENE.

INCOMPATIBILITIES:

1,1,2,2-TETRACHLOROETHANE:

ALKALI: FORMS FLAMMABLE CHLOROACETYLENE WHEN HEATED.

ALKALI METALS: FORM SHOCK-SENSITIVE MIXTURE.

ALUMINUM: MAY PRODUCE TOXIC VAPORS.

DINITROGEN TETROXIDE: FORMS SHOCK-SENSITIVE MIXTURE.

2,4-DINITROPHENYL DISULFIDE: VIOLENT REACTION.

IRON (MOLTEN) + STEAM: MAY FORM TOXIC VAPORS.

METALS (POWDERED): POSSIBLE VIOLENT REACTION.

PLASTICS: MAY BE ATTACKED.
POTASSIUM: FORMS SHOCK-SENSITIVE MIXTURE.
POTASSIUM ALLOYS: FORMS SHOCK-SENSITIVE MIXTURE.
POTASSIUM HYDROXIDE: FORMS FLAMMABLE CHLOROACETYLENE WHEN HEATED.
SODIUM: FORMS SHOCK-SENSITIVE MIXTURE.
SODIUM ALLOYS: FORMS SHOCK-SENSITIVE MIXTURE.
SODIUM-POTASSIUM ALLOYS: FORMS SHOCK-SENSITIVE MIXTURE.
ZINC: MAY FORM TOXIC VAPORS.

DECOMPOSITION:

THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE TOXIC AND CORROSIVE FUMES OF HYDROGEN CHLORIDE AND PHOSGENE, TOXIC OXIDES OF CARBON, AND FLAMMABLE CHLOROACETYLENE GAS.

POLYMERIZATION:

HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

****STORAGE****

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

STORE IN A COOL PLACE PROTECTED FROM LIGHT.

****DISPOSAL****

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40CFR 262. EPA HAZARDOUS WASTE NUMBER U209.

CONDITIONS TO AVOID

MAY BURN BUT DOES NOT IGNITE READILY. AVOID CONTACT WITH STRONG OXIDIZERS, EXCESSIVE HEAT, SPARKS, OR OPEN FLAME.

SPILL AND LEAK PROCEDURES

WATER SPILL:

THE CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986 (PROPOSITION 65) PROHIBITS CONTAMINATING ANY KNOWN SOURCE OF DRINKING WATER WITH SUBSTANCES KNOWN TO CAUSE CANCER AND/OR REPRODUCTIVE TOXICITY.

OCCUPATIONAL SPILL:

STOP LEAK IF YOU CAN DO IT WITHOUT RISK. FOR SMALL SPILLS, TAKE UP WITH SAND

OR OTHER ABSORBENT MATERIAL AND PLACE INTO CLEAN, DRY CONTAINERS FOR LATER DISPOSAL. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY.

REPORTABLE QUANTITY (RQ): 100 POUNDS

THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

PROTECTIVE EQUIPMENT

VENTILATION:

PROVIDE LOCAL EXHAUST OR PROCESS ENCLOSURE VENTILATION TO MEET THE PUBLISHED EXPOSURE LIMITS. VENTILATION EQUIPMENT MUST BE EXPLOSION-PROOF.

RESPIRATOR:

THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO CHEMICAL HAZARDS; NIOSH CRITERIA DOCUMENTS OR BY THE U.S. DEPARTMENT OF LABOR, 29 CFR 1910 SUBPART Z.

THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

1,1,2,2-TETRACHLOROETHANE:

AT ANY DETECTABLE CONCENTRATION:

ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE AND OPERATED IN A POSITIVE PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE AND OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ESCAPE- ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR (GAS MASK) WITH A CHIN-STYLE OR FRONT- OR BACK-MOUNTED ORGANIC VAPOR CANISTER.
ANY APPROPRIATE ESCAPE-TYPE SELF-CONTAINED BREATHING APPARATUS.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

CLOTHING:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:

EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT EYE CONTACT WITH THIS SUBSTANCE.

EMERGENCY EYE WASH: WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED BY- OCCUPATIONAL HEALTH SERVICES, INC.
CREATION DATE: 11/19/84 REVISION DATE: 10/29/91

OHS26400

79-34-5

1,1,2,2-TETRACHLOROETHANE

Copyright 1991 Occupational Health Services, Inc. All Rights Reserved.
Licensed to: fluor daniel inc.
To make unlimited paper copies for internal distribution and use only.

-> d l all

L7 ANSWER 1 OF 2

*
* MSDS Canadian Centre for Occupational Health and Safety *
*

AN 289134 MSDS-CCOHS

PRODUCT NAME(S): ***TETRACHLOROETHYLENE***

PRODUCT IDENTIFICATION: J.T. BAKER MSDS NUMBER: T0767
PRODUCT CODES: 9218,5380,9465,9453,9469

MANUFACTURER(S): J T BAKER CHEMICAL CO
222 RED SCHOOL LANE
PHILLIPSBURG NEW JERSEY
U.S.A. 08865

Emergency Telephone: 908-859-2151
800-424-9300 (CHEMTREC)
800-424-8802 (NATIONAL RESPONSE CENTER)

DATE OF MSDS: 1 May 1989

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC * (800) 424-9300 -- NATIONAL RESPONSE CENTER * (800) 424-8802

T0767 M05 TETRACHLOROETHYLENE PAGE: 1
EFFECTIVE: 05/01/89 ISSUED: 03/22/91

J.T.BAKER INC., 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: TETRACHLOROETHYLENE
COMMON SYNONYMS: PERCHLOROETHYLENE; ETHYLENE TETRACHLORIDE; CARBON BICHLORIDE;
CARBON DICHLORIDE
CHEMICAL FAMILY: CHLORINATED HYDROCARBONS
FORMULA: CL2C:CCL2
FORMULA WT.: 165.83
CAS NO.: 127-18-4

NIOSH/TECS NO.: KX3850000
PR CT USE: LABORATORY REAGENT
PRODUCT CODES: 9218, 5380, 9465, 9453, 9469

PRECAUTIONARY LABELING

BAKER SAF-T-DATA* SYSTEM

HEALTH	-	3	SEVERE (CANCER CAUSING)
FLAMMABILITY	-	0	NONE
REACTIVITY	-	1	SLIGHT
CONTACT	-	2	MODERATE

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

U.S. PRECAUTIONARY LABELING

WARNING

CAUSES IRRITATION. HARMFUL IF SWALLOWED OR INHALED. HEAT MAY CAUSE DECOMPOSITION AND GENERATE CORROSIVE VAPORS. NOTE: REPORTED AS CAUSING CANCER IN LABORATORY ANIMALS. EXERCISE DUE CARE. EXCEPTIONAL HEALTH AND CONTACT HAZARDS: READ MATERIAL SAFETY DATA SHEET.
KEEP AWAY FROM HEAT, SPARKS, FLAME. DO NOT GET IN EYES, ON SKIN, ON CLOTHING. DO NOT BREATHE VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF SPILL, SOAK UP WITH SAND OR EARTH.

CONTINUED ON PAGE: 2

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC * (800) 424-9300 -- NATIONAL RESPONSE CENTER * (800) 424-8802

T0767 M05
EFFECTIVE: 05/01/89

TETRACHLOROETHYLENE

PAGE: 2
ISSUED: 03/22/91

PRECAUTIONARY LABELING (CONTINUED)

INTERNATIONAL LABELING

HARMFUL BY INHALATION AND IF SWALLOWED.
KEEP OUT OF REACH OF CHILDREN. AVOID CONTACT WITH EYES.

SAF-T-DATA* STORAGE COLOR CODE: BLUE (HEALTH)

SECTION II - COMPONENTS

COMPONENT	CAS NO.	WEIGHT %	OSHA/PEL	ACGIH/TLV
TETRACHLOROETHYLENE	127-18-4	99-100	25 PPM	50 PPM

SECTION III - PHYSICAL DATA

BOILING POINT: 121 C (249 F) (AT 760 MM HG)	VAPOR PRESSURE (MMHG): 13 (20 C)
MELTING POINT: -22 C (-7 F) (AT 760 MM HG)	VAPOR DENSITY (AIR=1): 5.8
SPECIFIC GRAVITY: 1.62 (H ₂ O=1)	EVAPORATION RATE: 2.80 (BUTYL ACETATE = 1)
SOLUBILITY(H ₂ O): NEGLIGIBLE (<0.1%)	% VOLATILES BY VOLUME: 100 (21 C)
PH: N/A	
ODOR THRESHOLD (P.P.M.): N/A	PHYSICAL STATE: LIQUID
COEFFICIENT WATER/OIL DISTRIBUTION: N/A	
APPEARANCE & ODOR: CLEAR, COLORLESS LIQUID. CHLOROFORM-LIKE ODOR.	

CONTINUED ON PAGE: 3

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

T0767 M05
EFFECTIVE: 05/01/89

TETRACHLOROETHYLENE

PAGE: 3
ISSUED: 03/22/91

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP): N/A

NFPA 704M RATING: 2-0-0

AUTOIGNITION TEMPERATURE: N/A

FLAMMABLE LIMITS: UPPER - N/A LOWER - N/A

FIRE EXTINGUISHING MEDIA

USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES

FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE & EXPLOSION HAZARDS

CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE.

TOXIC GASES PRODUCED

HYDROGEN CHLORIDE, PHOSGENE, CHLORINE, CARBON MONOXIDE, CARBON DIOXIDE

EXPLOSION DATA-SENSITIVITY TO MECHANICAL IMPACT

NONE IDENTIFIED.

EX/ SION DATA-SENSITIVITY TO STATIC DISCHARGE

NONE IDENTIFIED.

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 335 MG/M3 (50 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): 1340 MG/M3 (200 PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): (100 PPM)

PEL (CEILING) - 200 PPM.

TOXICITY OF COMPONENTS

ORAL RAT LD50 FOR TETRACHLOROETHYLENE

3005 MG/KG

CONTINUED ON PAGE: 4

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

M A T E R I A L S A F E T Y D A T A S H E E T

24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151

CHEMTREC * (800) 424-9300 -- NATIONAL RESPONSE CENTER * (800) 424-8802

TO/4/ M05
EFFECTIVE: 05/01/89

TETRACHLOROETHYLENE

PAGE: 4
ISSUED: 03/22/91

SECTION V - HEALTH HAZARD DATA (CONTINUED)

INTRAPERITONEAL MOUSE LD50 FOR TETRACHLOROETHYLENE 4643 MG/KG
INHALATION-4HR MOUSE LC50 FOR TETRACHLOROETHYLENE 5200 PPM
CARCINOGENICITY: NTP: NO IARC: YES Z LIST: NO OSHA REG: NO

CARCINOGENICITY

THIS SUBSTANCE IS LISTED AS AN IARC PROBABLE HUMAN CARCINOGEN (GROUP 2B)
AND IS PROPOSED FOR ADDITION TO NTP'S FIFTH ANNUAL REPORT ON CARCINOGENS.

REPRODUCTIVE EFFECTS

TESTS ON LABORATORY ANIMALS INDICATE MATERIAL MAY CAUSE EMBRYONIC DEATH.

EFFECTS OF OVEREXPOSURE

INHALATION: HEADACHE, NAUSEA, VOMITING, DIZZINESS, DROWSINESS,
WEAKNESS, CONFUSION, IRRITATION OF UPPER RESPIRATORY
TRACT, CENTRAL NERVOUS SYSTEM DEPRESSION, RESPIRATORY
FAILURE, NARCOSIS, UNCONSCIOUSNESS

SKIN CONTACT: IRRITATION, PROLONGED CONTACT MAY CAUSE DERMATITIS

EYE CONTACT: IRRITATION, MAY CAUSE TEMPORARY CORNEAL DAMAGE

SKIN ABSORPTION: NONE IDENTIFIED

INGESTION: NAUSEA, VOMITING, HEADACHES, DIZZINESS, GASTROINTESTINAL
IRRITATION, CENTRAL NERVOUS SYSTEM DEPRESSION

CHRONIC EFFECTS: DAMAGE TO LIVER, KIDNEYS, LUNGS, SPLEEN, CENTRAL NERVOUS
SYSTEM

TARGET ORGANS

LIVER, KIDNEYS, EYES, RESPIRATORY SYSTEM, LUNGS, CENTRAL NERVOUS SYSTEM

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

LIVER OR KIDNEY DISORDERS, CENTRAL NERVOUS SYSTEM DISORDERS, ALCOHOLISM,
HEART DISORDERS

PRIMARY ROUTES OF ENTRY

INHALATION, INGESTION, EYE CONTACT, SKIN CONTACT

CONTINUED ON PAGE: 5

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC * (800) 424-9300 -- NATIONAL RESPONSE CENTER * (800) 424-8802

T0767 M05
EFFECTIVE: 05/01/89

TETRACHLOROETHYLENE

PAGE: 5
ISSUED: 03/22/91

SECTION V - HEALTH HAZARD DATA (CONTINUED)

EMERGENCY AND FIRST AID PROCEDURES

INGESTION: CALL A PHYSICIAN. IF SWALLOWED, DO NOT INDUCE VOMITING.

INHALATION: IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.

SKIN CONTACT: IN CASE OF CONTACT, IMMEDIATELY FLUSH SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. WASH CLOTHING BEFORE RE-USE.

EYE CONTACT: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

NOTES TO PHYSICIAN

DO NOT USE ADRENALIN OR EPINEPHRINE.

SARA/TITLE III HAZARD CATEGORIES AND LISTS

ACUTE: YES CHRONIC: YES FLAMMABILITY: NO PRESSURE: NO REACTIVITY: NO

EXTREMELY HAZARDOUS SUBSTANCE: NO

CERCLA HAZARDOUS SUBSTANCE: YES CONTAINS ETHENE, 1,1,2,2-TETRACHLORO (RQ - 1 LB)

SARA 313 TOXIC CHEMICALS: YES CONTAINS TETRACHLOROETHYLENE (PERCHLOROETHYLENE)
C03

GENERIC CLASS:

TSCA INVENTORY: YES

STATE LISTS: FOR PRODUCTS SOLD IN THE STATE OF CALIFORNIA, THE STATE REQUIRES THAT WE PROVIDE TO USERS AND THEIR EMPLOYEES THE FOLLOWING MESSAGE: WARNING:

THIS PRODUCT IS A CHEMICAL KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

SECTION VI - REACTIVITY DATA

STABILITY: STABLE

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, FLAME, OTHER SOURCES OF IGNITION

CONTINUED ON PAGE: 6

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

M A T E R I A L S A F E T Y D A T A S H E E T

24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151

CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

T0767 M05

TETRACHLOROETHYLENE

PAGE: 6

EFFECTIVE: 05/01/89

ISSUED: 03/22/91

SECTION VI - REACTIVITY DATA (CONTINUED)

INCOMPATIBLES: STRONG OXIDIZING AGENTS, ALKALI METALS, ALUMINUM,
CHEMICALLY ACTIVE METALS

DEPOSITION PRODUCTS: HYDROGEN CHLORIDE, PHOSGENE, CHLORINE, CARBON
MONOXIDE, CARBON DIOXIDE

SECTION VII - SPILL & DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. STOP
LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS.
TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE
INTO CONTAINER FOR LATER DISPOSAL. FLUSH SPILL AREA WITH WATER.

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL
ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: U210 (TOXIC WASTE)

SECTION VIII - INDUSTRIAL PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV
REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE

CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS ABOVE 50 PPM, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE SUIT, VITON GLOVES ARE RECOMMENDED.

CONTINUED ON PAGE: 7

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

T0767 M05
EFFECTIVE: 05/01/89

TETRACHLOROETHYLENE

PAGE: 7
ISSUED: 03/22/91

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA* STORAGE COLOR CODE: BLUE (HEALTH)

STORAGE REQUIREMENTS

KEEP CONTAINER TIGHTLY CLOSED. STORE IN SECURE POISON AREA. STORE IN A COOL, WELL-VENTILATED AREA AWAY FROM SOURCES OF HEAT, FLAME, OR IGNITION. ISOLATE FROM INCOMPATIBLE MATERIALS.

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME: TETRACHLOROETHYLENE (AIR ONLY)

HAZARD CLASS: ORM-A

UN/NA: UN1897 REPORTABLE QUANTITY: 1 LBS.

LABELS: NONE

REGULATORY REFERENCES: 49CFR 172.101; 173.500; 173.510

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME: TETRACHLOROETHYLENE

HAZARD CLASS: 6.1

UN: UN1897 MARINE POLLUTANTS: NO

LABELS: HARMFUL - STOW AWAY FROM FOOD STUFFS

REGULATORY REFERENCES: 49CFR 172.102; PART 176; IMO

AIR (I.C.A.O.)

I.M.O. PAGE: 6234

PACKAGING GROUP: III

PROPER SHIPPING NAME: TETRACHLOROETHYLENE
HAZARD CLASS: 6.1
UN: UN1897 PACKAGING GROUP: III
LABELS: HARMFUL - STOW AWAY FROM FOOD STUFFS
REGULATORY REFERENCES: 49CFR 172.101; 173.6; PART 175; ICAO/IATA
U.S. CUSTOMS HARMONIZATION NUMBER: 29032300007

CONTINUED ON PAGE: 8

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC * (800) 424-9300 -- NATIONAL RESPONSE CENTER * (800) 424-8802

T0767 M05 TETRACHLOROETHYLENE PAGE: 8
EFFECTIVE: 05/01/89 ISSUED: 03/22/91

N/A - NOT APPLICABLE OR NOT AVAILABLE
N/A NOT ESTABLISHED

THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET MEETS THE REQUIREMENTS OF THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ACT AND REGULATIONS PROMULGATED THEREUNDER (29 CFR 1910.1200 ET. SEQ.) AND THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM. THIS DOCUMENT IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY A PERSON TRAINED IN, OR SUPERVISED BY A PERSON TRAINED IN, CHEMICAL HANDLING. THE USER IS RESPONSIBLE FOR DETERMINING THE PRECAUTIONS AND DANGERS OF THIS CHEMICAL FOR HIS OR HER PARTICULAR APPLICATION. DEPENDING ON USAGE, PROTECTIVE CLOTHING INCLUDING EYE AND FACE GUARDS AND RESPIRATORS MUST BE USED TO AVOID CONTACT WITH MATERIAL OR BREATHING CHEMICAL VAPORS/FUMES.

EXPOSURE TO THIS PRODUCT MAY HAVE SERIOUS ADVERSE HEALTH EFFECTS. THIS CHEMICAL MAY INTERACT WITH OTHER SUBSTANCES. SINCE THE POTENTIAL USES ARE SO VARIED, BAKER CANNOT WARN OF ALL OF THE POTENTIAL DANGERS OF USE OR INTERACTION WITH OTHER CHEMICALS OR MATERIALS. BAKER WARRANTS THAT THE CHEMICAL MEETS THE SPECIFICATIONS SET FORTH ON THE LABEL. BAKER DISCLAIMS ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED WITH REGARD TO THE PRODUCT SUPPLIED HEREUNDER, ITS MERCHANTABILITY OR ITS FITNESS FOR A PARTICULAR PURPOSE.

THE USER SHOULD RECOGNIZE THAT THIS PRODUCT CAN CAUSE SEVERE INJURY AND EVEN DEATH, ESPECIALLY IF IMPROPERLY HANDLED OR THE KNOWN DANGERS OF USE ARE NOT HEEDED. READ ALL PRECAUTIONARY INFORMATION. AS NEW DOCUMENTED GENERAL SAFETY INFORMATION BECOMES AVAILABLE, BAKER WILL PERIODICALLY REEVALUATE THIS MATERIAL SAFETY DATA SHEET.

NOTE: CHEMTREC, CANUTEC, AND NATIONAL RESPONSE CENTER EMERGENCY TELEPHONE NUMBERS ARE TO BE USED ONLY IN THE EVENT OF CHEMICAL EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT INVOLVING CHEMICALS. ALL

NON-EMERGENCY QUESTIONS SHOULD BE DIRECTED TO CUSTOMER SERVICE
(1 0-JTBAKER) FOR ASSISTANCE.

COPYRIGHT 1991 J.T.BAKER INC.

* TRADEMARKS OF J.T.BAKER INC.

—
APPROVED BY QUALITY ASSURANCE DEPARTMENT.

-- LAST PAGE --

OHS23640

MATERIAL SAFETY DATA SHEET

OCCUPATIONAL HEALTH SERVICES, INC.
11 WEST 42ND STREET, 12TH FLOOR
NEW YORK, NEW YORK 10036
1-800-445-MSDS (1-800-445-6737) OR
1-212-789-3535

FOR EMERGENCY SOURCE INFORMATION
CONTACT: 1-615-366-2000

SUBSTANCE IDENTIFICATION

CAS NUMBER: 8001-35-2
RTECS NUMBER: XW5250000

SUBSTANCE: TOXAPHENE

TRADE NAMES/SYNONYMS:

ALLTOX; ANATOX; CAMPHECHLOR; CAMPHOCHLOR; CANTECLOR; CHLORINATED CAMPHENE;
ESTONOX; GENIPHENE; KAMFOCHLOR; POLYCHLOROCAMPHENE; STROBANE T; STROBANET;
TOXAKIL; TOXAPHEN; TOXYPHEN; NA2761; RCRA P123; STCC 4941189; C10H10CL8;
OHS23640

CHEMICAL FAMILY:
TERPENE

MOLECULAR FORMULA: C10-H10-CL8

MOLECULAR WEIGHT: 413.80

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=1 REACTIVITY=0 PERSISTENCE=3
NFPA RATINGS (SCALE 0-4): HEALTH=3 FIRE=1 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: TOXAPHENE
CAS# 8001-35-2

PERCENT: 100.0

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:

TOXAPHENE:

0.5 MG/M3 OSHA TWA (SKIN); 1 MG/M3 OSHA STEL
0.5 MG/M3 ACGIH TWA (SKIN); 1 MG/M3 ACGIH STEL
0.5 MG/M3 DFG MAK TWA (TOTAL DUST, SKIN)
5 MG/M3 DFG MAK 30 MINUTE PEAK, AVERAGE VALUE, 1 TIME/SHIFT

MEASUREMENT METHOD: PARTICULATE FILTER; PETROLEUM ETHER; GAS CHROMATOGRAPHY
WITH ELECTRON CAPTURE DETECTION; (NIOSH VOL. II(2) # S67).

500/10,000 POUNDS SARA SECTION 302 THRESHOLD PLANNING QUANTITY

1 POUND SARA SECTION 304 REPORTABLE QUANTITY

1 POUND CERCLA SECTION 103 REPORTABLE QUANTITY

SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING

SUBJECT TO CALIFORNIA PROPOSITION 65 CANCER AND/OR REPRODUCTIVE TOXICITY

WARNING AND RELEASE REQUIREMENTS- (JANUARY 1, 1988)

PHYSICAL DATA

DESCRIPTION: YELLOW TO AMBER WAXY SOLID WITH A PLEASANT, PINEY ODOR.

BOILING POINT: 311 F (155 C) (DECOMPOSES)

MELTING POINT: 149-194 F (65-90 C) SPECIFIC GRAVITY: 1.66 @ 27 C

VAPOR PRESSURE: 0.2-0.4 MMHG @ 25 C SOLUBILITY IN WATER: 0.0003% @ 20 C

SOLVENT SOLUBILITY: SOLUBLE IN ACETONE, BENZENE, CARBON TETRACHLORIDE, TOLUENE, XYLENE, HEXANE, DEODORIZED KEROSENE, MINERAL OIL, ETHANOL, ISOPROPYL ALCOHOL, PETROLEUM OILS, AND MOST AROMATIC HYDROCARBONS.

DEHYDROCHLORINATES IN THE PRESENCE OF STRONG SUNLIGHT AND AT TEMPERATURES ABOVE 311 F (155 C).

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
SLIGHT FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

DUST-AIR MIXTURES MAY IGNITE OR EXPLODE.

FLASH POINT: 275 F (135 C) (CC) FLAMMABILITY CLASS(OSHA): IIIB

FIREFIGHTING MEDIA:
DRY CHEMICAL, WATER SPRAY OR REGULAR FOAM
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FIREFIGHTING:
MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT WITHOUT RISK. FIGHT FIRE FROM MAXIMUM DISTANCE. STAY AWAY FROM ENDS OF TANKS. DIKE FIRE-CONTROL WATER FOR LATER DISPOSAL; DO NOT SCATTER THE MATERIAL (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5, GUIDE PAGE 55).

EXTINGUISH ONLY IF FLOW CAN BE STOPPED. EXTINGUISH USING AGENT INDICATED. USE FLOODING AMOUNTS OF WATER AS A FOG. COOL CONTAINERS WITH FLOODING AMOUNTS OF WATER FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING POISONOUS VAPORS, KEEP UPWIND. CONSIDER EVACUATION OF DOWNWIND AREA IF MATERIAL IS LEAKING.

TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49 CFR 172.101:
POISON B

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49 CFR 172.101 AND
SUBPART E:
POISON

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: 49 CFR 173.510
EXCEPTIONS: 49 CFR 173.505

TOXICITY

TOXAPHENE:

IRRITATION DATA: 500 MG SKIN-MAMMAL MODERATE.

TOXICITY DATA: 2000 MG/M3/2 HOURS INHALATION-MOUSE LCLO; 657 MG/KG SKIN-HUMAN TDLO; 1025 MG/KG SKIN-RABBIT LD50; 600 MG/KG SKIN-RAT LD50; 28 MG/KG ORAL-HUMAN LDLO; 29 MG/KG ORAL-MAN LDLO; 50 MG/KG ORAL-RAT LD50; 112 MG/KG ORAL-MOUSE LD50; 15 MG/KG ORAL-DOG LD50; 75 MG/KG ORAL-RABBIT LD50; 250 MG/KG ORAL-GUINEA PIG LD50; 200 MG/KG ORAL-HAMSTER LD50; 42 MG/KG INTRAPERITONEAL-MOUSE LD50; 70 MG/KG INTRAPERITONEAL-RAT LDLO; 44 MG/KG UNREPORTED-MAN LDLO; 45 MG/KG UNREPORTED-MOUSE LD50; 240 MG/KG UNREPORTED-RAT LD50; MUTAGENIC DATA (RTECS); REPRODUCTIVE EFFECTS DATA (RTECS); TUMORIGENIC DATA (RTECS).

CARCINOGEN STATUS: ANTICIPATED HUMAN CARCINOGEN (NTP); ANIMAL SUFFICIENT EVIDENCE (IARC GROUP-2B). PROLONGED ORAL ADMINISTRATION RESULTED IN AN INCREASE IN THE INCIDENCE OF HEPATOCELLULAR CARCINOMAS IN MICE AND THYROID TUMORS IN RATS.

ACUTE TOXICITY LEVEL: HIGHLY TOXIC BY INGESTION; MODERATELY TOXIC BY DERMAL ABSORPTION.

TARGET EFFECTS: CONVULSANT. POISONING MAY ALSO AFFECT THE LIVER, KIDNEYS, AND NERVOUS SYSTEM.

HEALTH EFFECTS AND FIRST AID

INHALATION:

TOXAPHENE:

200 MG/M3 IMMEDIATELY DANGEROUS TO LIFE OR HEALTH.

ACUTE EXPOSURE- MAY CAUSE IRRITATION. CASES OF ACUTE INTOXICATION BY INHALATION HAVE NOT BEEN REPORTED, HOWEVER TOXAPHENE CAN BE ABSORBED THROUGH THE LUNGS AND MAY CAUSE EFFECTS AS DETAILED IN ACUTE INGESTION. ALLERGIC BRONCHOPNEUMONIA HAS BEEN REPORTED IN WORKERS USING TOXAPHENE SPRAYS.

CHRONIC EXPOSURE- TWENTY-FIVE VOLUNTEERS WERE EXPOSED IN A CLOSED CHAMBER TO AN AEROSOL OF TOXAPHENE FOR 30 MINUTES A DAY FOR 10 CONSECUTIVE DAYS AT AN AVERAGE CONCENTRATION OF 500 MG/M3. AFTER THREE WEEKS THE SAME EXPOSURE WAS REPEATED FOR 3 DAYS. PHYSICAL EXAMINATION AND STUDY OF THE BLOOD AND URINE FAILED TO REVEAL ANY TOXIC EFFECT. OCCUPATIONAL EXPOSURE TO SOME ORGANOCHLORINE PESTICIDES HAS BEEN REPORTED TO CAUSE POLYNEURITIS, ENCEPHALOPOLYNEURITIS, AND NEUROVEGETATIVE SYNDROMES. OTHER EFFECTS MAY INCLUDE LIVER AND KIDNEY DAMAGE, CARDIOVASCULAR DISTURBANCES WITH DYSPNEA, HIGH HEART RATE, OPPRESSION AND PAIN IN THE REGION OF THE HEART. BLOOD AND CAPILLARY DISTURBANCES MAY OCCUR AND APPEARS AS THROMBOPENIA, ANEMIA, PANCYTOPENIA, AGRANULOCYTOSIS, HEMOLYSIS AND CAPILLARY DISORDERS.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:

TOXAPHENE:

ACUTE EXPOSURE- MAY CAUSE IRRITATION AND MAY BE ABSORBED THROUGH THE SKIN AND CAUSE EFFECTS AS DETAILED IN ACUTE INGESTION.
CHRONIC EXPOSURE- NO DATA AVAILABLE.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:

TOXAPHENE:

ACUTE EXPOSURE- NO DATA AVAILABLE.
CHRONIC EXPOSURE- NO DATA AVAILABLE.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:

TOXAPHENE:

CONVULSANT/CARCINOGEN/HIGHLY TOXIC.

ACUTE EXPOSURE- THE SUSPECTED LETHAL DOSE FOR HUMANS IS 2-7 GRAMS. SYMPTOMS USUALLY APPEAR WITHIN 1 HOUR, AND DEATH WITHIN 4 TO 24 HOURS. SYMPTOMS MAY INCLUDE NAUSEA, VOMITING, DIARRHEA, STOMACH PAINS, HEADACHE, DIZZINESS, ATAXIA, PARESTHESIA, MENTAL CONFUSION, JERKING OF THE ARMS AND LEGS, AND CONVULSIONS. GRADUAL TREMORS MAY OCCUR STARTING FROM THE EYELIDS AND THE FACE MUSCLES, DESCENDING TOWARDS THE WHOLE BODY AND IN THE LIMBS. IN FATAL CASES, SYMPTOMS BEGIN AS EARLY AS HALF AN HOUR AFTER EXPOSURE AND INCLUDE FREQUENT VIOLENT CONVULSIONS AND CYANOSIS. CONVULSIONS MAY BE ACCOMPANIED WITH ELEVATED TEMPERATURE, UNCONSCIOUSNESS, AND GENERALIZED DEPRESSION AND MAY RESULT IN DEATH DUE TO ANOXIA AND RESPIRATORY FAILURE. IN NONFATAL CASES, CESSATION OF CONVULSIONS MAY BE FOLLOWED BY A PERIOD OF WEAKNESS, LASSITUDE, AND AMNESIA. PATIENTS MAY DEVELOP SIGNS OF TOXIC HEPATITIS, TOXIC NEPHROPATHY, PROLONGED TOXIC POLYNEURITIS, ANEMIA AND HEMORRHAGIC DIATHESIS. ALLERGIC BRONCHOPNEUMONIA IS TYPICAL OF TOXAPHENE POISONING. ANOREXIA, OLIGODIPSEA, DIURESIS, GLYCOSURIA, LOSS OF BODY WEIGHT, AND HYPOTHERMIA HAVE BEEN OBSERVED IN RATS POISONED BY TOXAPHENE.

CHRONIC EXPOSURE- ANIMAL STUDIES INDICATE REPEATED OR PROLONGED INGESTION MAY CAUSE CONVULSIONS, DAMAGE TO THE KIDNEYS, AND DEGENERATIVE CHANGES TO THE LIVER. AN INCREASE IN THE INCIDENCE OF HEPATOCELLULAR CARCINOMA AND THYROID TUMORS WAS OBSERVED IN MICE AND RATS RESPECTIVELY AFTER CHRONIC ORAL ADMINISTRATION. REPRODUCTIVE EFFECTS HAVE BEEN REPORTED IN ANIMALS.

FIRST AID- IF THE PERSON IS CONSCIOUS AND NOT CONVULSING, REMOVE BY GIVING SYRUP OF IPECAC (IF VOMITING OCCURS, KEEP THE HEAD BELOW THE HIPS TO PREVENT ASPIRATION). GIVE ACTIVATED CHARCOAL FOLLOWED BY GASTRIC LAVAGE. FOLLOW WITH

A SALINE CATHARTIC. DO NOT GIVE FATS OR OILS. INTESTINAL LAVAGE WITH 20% MANNITOL (200 ML) BY STOMACH TUBE IS ALSO USEFUL. GIVE ARTIFICIAL RESPIRATION WITH OXYGEN IF RESPIRATION IS DEPRESSED (DREISBACH, HANDBOOK OF POISONING, 12TH ED.). TREAT SYMPTOMATICALLY AND SUPPORTIVELY. LAVAGE AND ADMINISTRATION OF OXYGEN SHOULD BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL. GET MEDICAL ATTENTION IMMEDIATELY.

ANTIDOTE:

NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

REACTIVITY:

STABLE UNDER NORMAL TEMPERATURES AND PRESSURES.

INCOMPATIBILITIES:

TOXAPHENE:

ALKALIS: DEHYDROCHLORINATES WITH HEAT.

IRON: CORRODES WITH MOISTURE.

OXIDIZERS (STRONG): FIRE AND EXPLOSION HAZARD.

DECOMPOSITION:

THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE TOXIC AND CORROSIVE FUMES OF CHLORIDES AND TOXIC OXIDES OF CARBON.

POLYMERIZATION:

HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

STORAGE

STORE IN ACCORDANCE WITH 40 CFR 165 RECOMMENDED PROCEDURES FOR THE DISPOSAL AND STORAGE OF PESTICIDES AND PESTICIDE CONTAINERS.

STORE IN A COOL, DRY PLACE PROTECTED AGAINST LIGHT.

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

THRESHOLD PLANNING QUANTITY (TPQ):

THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 302 REQUIRES THAT EACH FACILITY WHERE ANY EXTREMELY HAZARDOUS SUBSTANCE IS PRESENT IN A QUANTITY EQUAL TO OR GREATER THAN THE TPQ ESTABLISHED FOR THAT SUBSTANCE NOTIFY THE STATE EMERGENCY RESPONSE COMMISSION FOR THE STATE IN WHICH IT IS LOCATED. SECTION 303 OF SARA REQUIRES THESE FACILITIES TO PARTICIPATE IN EMERGENCY RESPONSE PLANNING (40 CFR 355.30).

****DISPOSAL****

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40CFR 262. EPA HAZARDOUS WASTE NUMBER P123.

TOXAPHENE - REGULATORY LEVEL: 0.5 MG/L

MATERIALS WHICH CONTAIN THE ABOVE SUBSTANCE AT OR ABOVE THE REGULATORY LEVEL MEET THE EPA CHARACTERISTIC OF TOXICITY, AND MUST BE DISPOSED OF IN ACCORDANCE WITH 40 CFR PART 262. EPA HAZARDOUS WASTE NUMBER D015.

CONDITIONS TO AVOID

MAY BURN BUT DOES NOT IGNITE READILY. CONTAINERS MAY EXPLODE IN HEAT OF FIRE.

SPILL AND LEAK PROCEDURES

SOIL SPILL:

DIG A PIT, POND, LAGOON OR HOLDING AREA TO CONTAIN LIQUID OR SOLID MATERIAL. COVER SOLIDS WITH A PLASTIC SHEET TO PREVENT DISSOLVING IN RAIN OR FIREFIGHTING WATER.

WATER SPILL:

USE NATURAL DEEP WATER POCKETS, EXCAVATED LAGOONS, OR SAND BAG BARRIERS TO TRAP MATERIAL AT BOTTOM. USE ACTIVATED CARBON AT 10 TIMES THE SPILLED AMOUNT IF IT IS DISSOLVED AT 10 PPM OR GREATER CONCENTRATION. REMOVE TRAPPED MATERIAL WITH SUCTION HOSES. USE MECHANICAL DREDGES OR LIFTS TO REMOVE IMMOBILIZED MASSES OF POLLUTION AND PRECIPITATES.

THE CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986 (PROPOSITION 65) PROHIBITS CONTAMINATING ANY KNOWN SOURCE OF DRINKING WATER WITH SUBSTANCES KNOWN TO CAUSE CANCER AND/OR REPRODUCTIVE TOXICITY.

OCCUPATIONAL SPILL:

DO NOT TOUCH SPILLED MATERIAL. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR SMALL DRY SPILLS, WITH A CLEAN SHOVEL PLACE MATERIAL INTO CLEAN, DRY CONTAINERS AND COVER. MOVE CONTAINERS FROM SPILL AREA. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY. VENTILATE CLOSED SPACES BEFORE ENTERING.

REPORTABLE QUANTITY (RQ): 1 POUND

THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

 PROTECTIVE EQUIPMENT

VENTILATION:

PROVIDE LOCAL EXHAUST VENTILATION TO MEET PUBLISHED EXPOSURE LIMITS.
 VENTILATION EQUIPMENT MUST BE EXPLOSION-PROOF.

RESPIRATOR:

THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO CHEMICAL HAZARDS; NIOSH CRITERIA DOCUMENTS OR BY THE U.S. DEPARTMENT OF LABOR, 29 CFR 1910 SUBPART Z.

THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

TOXAPHENE:

AT ANY DETECTABLE CONCENTRATION:

ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ESCAPE- ANY AIR-PURIFYING, FULL-FACEPIECE RESPIRATOR (GAS MASK) WITH A CHIN-STYLE, FRONT- OR BACK-MOUNTED ORGANIC VAPOR CANISTER HAVING A HIGH-EFFICIENCY PARTICULATE FILTER.

ANY APPROPRIATE ESCAPE-TYPE, SELF-CONTAINED BREATHING APPARATUS.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

CLOTHING:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT REPEATED OR PROLONGED SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:

EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT EYE CONTACT WITH THIS SUBSTANCE.

EMERGENCY EYE WASH: WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED BY- OCCUPATIONAL HEALTH SERVICES, INC.
CREATION DATE: 12/29/86 REVISION DATE: 04/10/91

OHS23640
8001-35-2
TOXAPHENE

Copyright 1991 Occupational Health Services, Inc. All Rights Reserved.
Licensed to: fluor daniel inc.
To make unlimited paper copies for internal distribution and use only.

-> d 2 all

L12 ANSWER 2 OF 3

*
* MSDS Canadian Centre for Occupational Health and Safety *
*

AN 343096 MSDS-CCOHS

PRODUCT NAME(S): 1,2,4-TRICHLOROBENZENE

PRODUCT IDENTIFICATION: J.T. BAKER MSDS NUMBER: T4875
CAS NO.: 120-82-1
9444,W479

MANUFACTURER(S): J T BAKER CHEMICAL CO

222 RED SCHOOL LANE
PHILLIPSBURG NEW JERSEY
U.S.A. 08865

Emergency Telephone: 908-859-2151
800-424-9300 (CHEMTREC)
800-424-8802 (NATIONAL RESPONSE CENTER)

DATE OF MSDS: 1 May 1989

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

T4875 -03
EFFECTIVE: 05/01/89

1,2,4-TRICHLOROBENZENE

PAGE: 1
ISSUED: 09/28/91

J.T.BAKER INC., 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: 1,2,4-TRICHLOROBENZENE
COMMON SYNONYMS: UNSYM-TRICHLOROBENZENE
CHEMICAL FAMILY: CHLORINATED HYDROCARBONS
FORMULA: C6H3CL3
FORMULA WT.: 181.45
CAS NO.: 120-82-1

NIOSH/RTCS NO.: DC2100000
PRODUCT USE: LABORATORY REAGENT
PRODUCT CODES: 9444,W479

PRECAUTIONARY LABELING

BAKER SAF-T-DATA* SYSTEM

HEALTH	-	1	SLIGHT
FLAMMABILITY	-	1	SLIGHT
REACTIVITY	-	1	SLIGHT
CONTACT	-	1	SLIGHT

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES; LAB COAT

U.S. PRECAUTIONARY LABELING

CAUTION

MAY CAUSE IRRITATION.
DURING USE AVOID CONTACT WITH EYES, SKIN, CLOTHING. WASH THOROUGHLY AFTER
HANDLING. WHEN NOT IN USE KEEP IN TIGHTLY CLOSED CONTAINER.

INTERNATIONAL LABELING

HARMFUL BY INHALATION, IN CONTACT WITH SKIN AND IF SWALLOWED.
AFTER CONTACT WITH SKIN, WASH IMMEDIATELY WITH PLENTY OF SOAP AND WATER.

SAF-T-DATA* STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

CONTINUED ON PAGE: 2

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC * (800) 424-9300 -- NATIONAL RESPONSE CENTER * (800) 424-8802

T4875 -03
EFFECTIVE: 05/01/89

1,2,4-TRICHLOROBENZENE

PAGE: 2
ISSUED: 09/28/91

SECTION II - COMPONENTS

COMPONENT	CAS NO.	WEIGHT %	OSHA/PEL	ACGIH/TLV
-----------	---------	----------	----------	-----------

1,2,4-TRICHLOROBENZENE	120-82-1	90-100	5 PPM	5 PPM
------------------------	----------	--------	-------	-------

SECTION III - PHYSICAL DATA

BOILING POINT: 213 C (415 F)
(AT 760 MM HG)

VAPOR PRESSURE (MMHG): N/A

MELTING POINT: 17 C (62 F)
(AT 760 MM HG)

VAPOR DENSITY (AIR=1): 6.2

SPECIFIC GRAVITY: 1.45
(H2O=1)

EVAPORATION RATE: N/A

SOLUBILITY(H2O): NEGLIGIBLE (<0.1%)

% VOLATILES BY VOLUME: 100
(21 C)

PH: N/A

ODOR THRESHOLD (P.P.M.): N/A

PHYSICAL STATE: LIQUID

COEFFICIENT WATER/OIL DISTRIBUTION: N/A

APPEARANCE & ODOR: CLEAR, NEARLY COLORLESS LIQUID. AROMATIC ODOR.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP): 109 C (230 F)

NFPA 704M RATING: 2-1-0

AUTOIGNITION TEMPERATURE: N/A

FLAMMABLE LIMITS: UPPER - 6.6 % LOWER - 2.5 %

FIRE EXTINGUISHING MEDIA

USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES

FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE.

CONTINUED ON PAGE: 3

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

EFFECTIVE: 05/01/89

ISSUED: 09/28/91

SECTION IV - FIRE AND EXPLOSION HAZARD DATA (CONTINUED)

UNUSUAL FIRE & EXPLOSION HAZARDS

NONE IDENTIFIED.

TOXIC GASES PRODUCED

PHOSGENE, HYDROGEN CHLORIDE, CARBON MONOXIDE, CARBON DIOXIDE

EXPLOSION DATA-SENSITIVITY TO MECHANICAL IMPACT

NONE IDENTIFIED.

EXPLOSION DATA-SENSITIVITY TO STATIC DISCHARGE

NONE IDENTIFIED.

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 40 MG/M3 (5 PPM)

TLV LISTED DENOTES CEILING LIMIT.

SHORT-TERM EXPOSURE LIMIT (STEL): NOT ESTABLISHED

PERMISSIBLE EXPOSURE LIMIT (PEL): NOT ESTABLISHED

TOXICITY OF COMPONENTS

ORAL RAT LD50 FOR 1,2,4-TRICHLOROBENZENE	756	MG/KG
ORAL MOUSE LD50 FOR 1,2,4-TRICHLOROBENZENE	300	MG/KG
CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO		

CARCINOGENICITY

NONE IDENTIFIED.

REPRODUCTIVE EFFECTS

NONE IDENTIFIED.

CONTINUED ON PAGE: 4

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

T4875 -03
EFFECTIVE: 05/01/89

1,2,4-TRICHLOROBENZENE

PAGE: 4
ISSUED: 09/28/91

SECTION V - HEALTH HAZARD DATA (CONTINUED)

EFFECTS OF OVEREXPOSURE

INHALATION: NONE IDENTIFIED

SKIN CONTACT: IRRITATION, PROLONGED CONTACT MAY CAUSE SKIN
SENSITIZATION

EYE CONTACT: IRRITATION

SKIN ABSORPTION: NONE IDENTIFIED

INGESTION: NONE IDENTIFIED

CHRONIC EFFECTS: NONE IDENTIFIED

TARGET ORGANS

NONE IDENTIFIED

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

NONE IDENTIFIED

PRIMARY ROUTES OF ENTRY

SKIN CONTACT, EYE CONTACT

EMERGENCY AND FIRST AID PROCEDURES

INGESTION: IF SWALLOWED AND THE PERSON IS CONSCIOUS, IMMEDIATELY GIVE
LARGE AMOUNTS OF WATER. GET MEDICAL ATTENTION.

INHALATION: IF A PERSON BREATHE IN LARGE AMOUNTS, MOVE THE EXPOSED
PERSON TO FRESH AIR.

SKIN CONTACT: IN CASE OF CONTACT, IMMEDIATELY WASH SKIN WITH PLENTY OF
SOAP AND WATER FOR AT LEAST 15 MINUTES.

EYE CONTACT: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF
WATER FOR AT LEAST 15 MINUTES.

SARA/TITLE III HAZARD CATEGORIES AND LISTS

ACUTE: YES CHRONIC: YES FLAMMABILITY: NO PRESSURE: NO REACTIVITY: NO

CONTINUED ON PAGE: 5

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

T4875 -03
EFFECTIVE: 05/01/89

1,2,4-TRICHLOROBENZENE

PAGE: 5
ISSUED: 09/28/91

SECTION V - HEALTH HAZARD DATA (CONTINUED)

EXTREMELY HAZARDOUS SUBSTANCE: NO
CERCLA HAZARDOUS SUBSTANCE: YES CONTAINS 1,2,4-TRICHLOROBENZENE (RQ - 100 LBS)
SARA 313 TOXIC CHEMICALS: YES CONTAINS 1,2,4-TRICHLOROBENZENE
GENERIC CLASS: C04
TSCA INVENTORY: YES

SECTION VI - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR
CONDITIONS TO AVOID: HEAT, FLAME, OTHER SOURCES OF IGNITION
INCOMPATIBLES: STRONG OXIDIZING AGENTS
DECOMPOSITION PRODUCTS: HYDROGEN CHLORIDE, CARBON MONOXIDE, CARBON DIOXIDE

SECTION VII - SPILL & DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SUITABLE PROTECTIVE CLOTHING. TAKE UP WITH SAND OR OTHER
NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE INTO CONTAINER FOR LATER
DISPOSAL. FLUSH SPILL AREA WITH WATER.

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL
ENVIRONMENTAL REGULATIONS.

SECTION VIII - INDUSTRIAL PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION IS HIGH, A CHEMICAL CARTRIDGE RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE IS RECOMMENDED. IF CONCENTRATION EXCEEDS CAPACITY OF CARTRIDGE RESPIRATOR, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

CONTINUED ON PAGE: 6

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

T4875 -03
EFFECTIVE: 05/01/89

1,2,4-TRICHLOROBENZENE

PAGE: 6
ISSUED: 09/28/91

SECTION VIII - INDUSTRIAL PROTECTIVE EQUIPMENT (CONTINUED)

EYE/SKIN PROTECTION: SAFETY GOGGLES, NEOPRENE GLOVES ARE RECOMMENDED.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA* STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

STORAGE REQUIREMENTS

KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA.

SPECIAL PRECAUTIONS

PRODUCT MAY SOLIDIFY AT ROOM TEMPERATURE.

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME: HAZARDOUS SUBSTANCE, LIQUID, N.O.S.

(1,2,4-TRICHLOROBENZENE)
HAZARD CLASS: ORM-E
UN/NA: NA9188 REPORTABLE QUANTITY: 100 LBS.
LABELS: NONE
REGULATORY REFERENCES: 49CFR 172.101; 173.500; 173.510

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME: TRICHLOROBENZENES, LIQUID
HAZARD CLASS: 6.1 I.M.O. PAGE: 6241
UN: UN2321 MARINE POLLUTANTS: NO PACKAGING GROUP: III
LABELS: HARMFUL - STOW AWAY FROM FOOD STUFFS
REGULATORY REFERENCES: 49CFR 172.102; PART 176; IMO

AIR (I.C.A.O.)

PROPER SHIPPING NAME: TRICHLOROBENZENES, LIQUID
HAZARD CLASS: 6.1
UN: UN2321 PACKAGING GROUP: III
LABELS: HARMFUL - STOW AWAY FROM FOOD STUFFS

CONTINUED ON PAGE: 7

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

T4875 -03 1,2,4-TRICHLOROBENZENE PAGE: 7
EFFECTIVE: 05/01/89 ISSUED: 09/28/91

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION (CONTINUED)

REGULATORY REFERENCES: 49CFR 172.101; 173.6; PART 175; ICAO/IATA

U.S. CUSTOMS HARMONIZATION NUMBER: 29036900002

EPA/TSCA EXPORT NOTIFICATION

YES

N/A - NOT APPLICABLE OR NOT AVAILABLE

N/E - NOT ESTABLISHED

THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET MEETS THE
REQUIREMENTS OF THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ACT AND

REGULATIONS PROMULGATED THEREUNDER (29 CFR 1910.1200 ET. SEQ.) AND THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM. THIS DOCUMENT IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY A PERSON TRAINED IN, OR SUPERVISED BY A PERSON TRAINED IN, CHEMICAL HANDLING. THE USER IS RESPONSIBLE FOR DETERMINING THE PRECAUTIONS AND DANGERS OF THIS CHEMICAL FOR HIS OR HER PARTICULAR APPLICATION. DEPENDING ON USAGE, PROTECTIVE CLOTHING INCLUDING EYE AND FACE GUARDS AND RESPIRATORS MUST BE USED TO AVOID CONTACT WITH MATERIAL OR BREATHING CHEMICAL VAPORS/FUMES.

EXPOSURE TO THIS PRODUCT MAY HAVE SERIOUS ADVERSE HEALTH EFFECTS. THIS CHEMICAL MAY INTERACT WITH OTHER SUBSTANCES. SINCE THE POTENTIAL USES ARE SO VARIED, BAKER CANNOT WARN OF ALL OF THE POTENTIAL DANGERS OF USE OR INTERACTION WITH OTHER CHEMICALS OR MATERIALS. BAKER WARRANTS THAT THE CHEMICAL MEETS THE SPECIFICATIONS SET FORTH ON THE LABEL.

BAKER DISCLAIMS ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED WITH REGARD TO THE PRODUCT SUPPLIED HEREUNDER, ITS MERCHANTABILITY OR ITS FITNESS FOR A PARTICULAR PURPOSE.

THE USER SHOULD RECOGNIZE THAT THIS PRODUCT CAN CAUSE SEVERE INJURY AND EVEN DEATH, ESPECIALLY IF IMPROPERLY HANDLED OR THE KNOWN DANGERS OF USE ARE NOT HEEDDED. READ ALL PRECAUTIONARY INFORMATION. AS NEW DOCUMENTED GENERAL SAFETY INFORMATION BECOMES AVAILABLE, BAKER WILL PERIODICALLY REVISE THIS MATERIAL SAFETY DATA SHEET.

NOTE: CHEMTREC, CANUTEC, AND NATIONAL RESPONSE CENTER EMERGENCY TELEPHONE NUMBERS ARE TO BE USED ONLY IN THE EVENT OF CHEMICAL EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT INVOLVING CHEMICALS. ALL NON-EMERGENCY QUESTIONS SHOULD BE DIRECTED TO CUSTOMER SERVICE (1-800-JTBAKER) FOR ASSISTANCE.

COPYRIGHT 1991 J.T.BAKER INC.

* TRADEMARKS OF J.T.BAKER INC.

CONTINUED ON PAGE: 8

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC * (800) 424-9300 -- NATIONAL RESPONSE CENTER * (800) 424-8802

T4875 -03
EFFECTIVE: 05/01/89

1,2,4-TRICHLOROBENZENE

PAGE: 8
ISSUED: 09/28/91

APPROVED BY QUALITY ASSURANCE DEPARTMENT.

-- LAST PAGE --

File 1; Entry 1; Accession No. 11330
(MID) Material Identification:

1,1,1-TRICHLOROETHANE

Material Safety Data Sheet

Effective Date: 03-19-90 Supersedes 04-06-89

PRODUCT IDENTIFICATION:

Synonyms: Methyl chloroform; trichloroethane; chloroetene;
1,1,1-trichloroethane

Formula CAS No.: 71-55-6

Molecular Weight: 133.40

Hazardous Ingredients:

Chemical Formula: CH₃CCl₃

Every lot contains a minimum 96%

Trichloroethane (stabilized).

Stabilizers can vary for each lot and may
include

the following in proprietary concentrations:

CAS No. 123-91-1 diethylene ether

78-92-2 sec butanol

(PHAZ) Primary Hazards:

PRECAUTIONARY MEASURES

WARNING! HARMFUL IF SWALLOWED OR INHALED. AFFECTS CENTRAL NERVOUS SYSTEM.
CAUSES IRRITATION.

Avoid breathing vapor.

Keep container closed.

Use only with adequate ventilation.

Wash thoroughly after handling.

Avoid contact with eyes, skin and clothing.

(AID) First Aid:

EMERGENCY FIRST AID

Call a physician immediately. If swallowed give several glasses of milk or water. If medical help is not immediately available and the amount swallowed was appreciable, induce vomiting. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes.

SEE SECTION 5.

DOT Hazard Class: ORM-A

(PHYS) Physical Properties:

Physical Data

Appearance: Clear, colorless solution.

Odor: Mild chloroform-like odor.

Solubility: 0.07g/100g water @ 25.C (77.F)

Boiling Point: 74 C (165 F).

Vapor Density (Air=1):4.55

Melting Point: -32 C (-26 F).

Vapor Pressure (mm Hg):100 @ 20 C (68 F).

Specific Gravity: 1.32

Evaporation Rate:(ethylether=1):
0.35

NFPA Ratings: Health: 3 Flammability: 1 Reactivity: 1

(FHAZ) Fire Hazards:

Fire and Explosion

SECTION 2

Information

Fire: Considered nearly nonflammable. Autoignition temperature: 537 C (998 F). Flammable limits in air, % by volume; lel 8.0, uel: 10.5. Within the flammable limits, ignition may occur upon contact with a high-intensity source of heat.

Explosion: Can react with strong caustic, such as potash to form a flammable or explosive material.

Fire Extinguishing Media: Dry chemical, foam or carbon dioxide. Do not use water.

Special Information: In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

(HAZR) Hazardous Reactions:

Reactivity Data

SECTION 3

Stability:

Requires inhibitor content to prevent corrosion of metals. Slowly hydrolyzes in water to form hydrochloric and acetic acid.

Hazardous Decomposition

Products:

Emits toxic and corrosive hydrogen chloride, and small amounts of chlorine and phosgene when heated to decomposition.

Hazardous Polymerization: This substance does not polymerize.

Incompatibilities:

Acetone, nitrogen tetroxide, oxygen, liquid oxygen, sodium, sodium hydroxide, and sodium-potassium alloy.

(SPIL) Spillage Disposal:

Leak/Spill Disposal Information

SECTION 4

Dike and cover leaking or spilled liquid with dirt, vermiculite, kitty-litter or other inert absorbent. Collected waste may be transferred to a closed, preferably metal, container and sent to a RCRA-approved waste disposal facility. Ventilate the area of the leak or spill. Do not use aluminum, magnesium or zinc metal for storage container. Reportable Quantity (RQ) (CWA/CERCLA): 1000 lb. trichloroethane, 100 lb. dioxane.

Ensure compliance with local, state and federal regulations.

(HAZH) Health Hazards:

Health Hazard Information

SECTION 5

A. Exposure/Health Effects

Inhalation:

May cause headache, dizziness, nausea, fall in blood pressure, unconsciousness, and death. May cause sensitization to the myocardium, and kidney and liver damage after severe exposure. Affects the central nervous system.

Ingestion:

Systemic poisoning may occur through ingestion; symptoms may parallel inhalation. Swallowing irritates the gastrointestinal tract. Vomiting and subsequent aspiration into the lungs may lead to chemical pneumonia and pulmonary edema which is a

potentially fatal condition.

Skin Contact: May cause mild irritation and redness.

Eye Contact: Liquids and vapors may cause irritation.

Chronic Exposure: Prolonged or repeated skin contact may cause dermatitis.

Aggravation of

Pre-existing Conditions: Preclude personnel with CNS, liver or heart disease from exposure. Use of alcoholic beverages may aggravate symptoms.

B. FIRST AID

Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion: Aspiration hazard. Call a physician immediately. If swallowed give several glasses of milk or water. If medical help is not immediately available and the amount swallowed was appreciable, induce vomiting. Never give anything by mouth to an unconscious person.

Skin Exposure: Remove any contaminated clothing. Wash skin with soap or mild detergent and water for at least 15 minutes. Get medical attention if irritation develops or persists.

Eye Exposure: Wash eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

C. TOXICITY (RTECS, 1982)

Oral rat LD50: 10300 mg/kg. Mutation references cited. Reproductive data cited. Irritation data: skin rabbit 500mg/24H moderate eye rabbit 2mg/24H severe

(CTL) Control Measures:

Occupational Control Measures SECTION 6

Airborne Exposure Limits: -OSHA Permissible Exposure Limit (PEL): 350 ppm (TWA), 450 ppm (STEL) -ACGIH Threshold Limit Value (TLV): 350 ppm (TWA), 450 ppm (STEL)

Ventilation System: A system of local and/or general exhaust is recommended to keep employee exposures below the

Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, "Industrial Ventilation, A Manual of Recommended Practices", most recent edition, for details.

**Personal Respirators
(NIOSH Approved)**

If the TLV is exceeded a full facepiece chemical cartridge respirator may be worn, in general, up to 100 times the TLV or the maximum use concentration specified by the respirator supplier, whichever is less. Alternatively, a supplied air full facepiece respirator or airlined hood may be worn.

Skin Protection:

Rubber or neoprene gloves and additional protection including impervious boots, apron, or coveralls, as needed in areas of unusual exposure.

Eye Protection:

Use chemical safety goggles. Contact lenses should not be worn when working with this material. Maintain eye wash fountain and quick-drench facilities in work area.

(STOR) Storage Procedures:

Storage and Special Information SECTION 7

Keep in a tightly closed container. Store in a cool, dry, ventilated area away from sources of heat or ignition. Protect against physical damage.

(DISC) Disclaimer:

The information contained herein is provided in good faith and is believed to be correct as of the date hereof. However, Mallinckrodt, Inc. makes no representation as to the comprehensiveness or accuracy of the information. It is expected that individuals receiving the information will exercise their independent judgment in determining its appropriateness for a particular purpose. Accordingly, Mallinckrodt, Inc. will not be responsible for damages of any kind resulting from the use of or reliance upon such information. NO REPRESENTATIONS, OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR TO THE PRODUCT TO WHICH THE INFORMATION REFERS.

(ADD) Addendum:

Addendum to Material Safety Data Sheet

REGULATORY STATUS

This Addendum Must Not Be
Detached from the MSDS
Identifies SARA 313 substance(s)

Any copying or redistribution of the MSDS
must include a copy of this addendum

Hazard Categories for SARA
Section 311/312 Reporting

Acute	Chronic	Fire	Pressure	Reactive
X			X	

Product or Components of Product:	SARA EHS		SARA Sec. 313 Chemicals		CERCLA	RCRA
	RQ	TPQ	List	Name Category	RQ lbs	Sec.103 Sec. 261.33
1,1,1-TRICHLOROETHANE						
Methyl chloroform						
(71-55-6) 96-100%	No	No	Yes	No	No	No
Dioxane (123-91-1) < 4%	No	No	Yes	No	No	No
sec-Butyl alcohol						
(78-92-2) < 4%	No	No	Yes	No	No	No
Actual concentrations proprietary						

1,1,1-TRICHLOROETHANE

Methyl chloroform

(71-55-6) 96-100%

Dioxane (123-91-1) < 4%

sec-Butyl alcohol

(78-92-2) < 4%

Actual concentrations proprietary

SARA Section 302 EHS RQ:

Reportable Quantity of Extremely Hazardous Substance; listed at 40 CFR 355.

SARA Section 302 EHS TPQ:

Threshold Planning Quantity of Extremely Hazardous substance. An asterisk (*) following a Threshold Planning Quantity signifies that if the material is a solid and has a particle size equal to or larger than 100 micrometers, the Threshold Planning Quantity = 10,000 LBS.

SARA Section 313 Chemicals:

Toxic Substances subject to annual release reporting requirements listed at 40 CFR 372.65.

CERCLA Sec. 103:

Comprehensive Environmental Response, Compensation and Liability Act (Superfund).

Releases to air, land or water of these hazardous substances which exceed the

Reportable Quantity (RQ) must be reported to the National Response Center,
(800-424-8802); Listed at 40 CFR 302.4

RCRA:

Resource Conservation and Reclamation Act. Commercial chemical product wastes
designated as acute hazards and toxic under 40 CFR 261.33

Warning: No responses for: LOG

Continue (Y/N/Expand)(Y)? N

Option? LOGOUT

Your approximate total CIS session cost is \$ 5.23

Killed Job 37, User CIS: 1045.1, Account CIS1.1045.1, TTY 41,

at 31-Oct-91 10:17:54-EST,

Used 1.68 Resource Units in 0:00:08

AMShare Remote Computing Service, System AMS20E (2743),
AMShare Monitor 316

@

RING

RING

-> d 1 all 1

L1 ANSWER 1 OF 2

*
* MSDS Canadian Centre for Occupational Health and Safety *
*

AN 343098 MSDS-CCOHS

PRODUCT NAME(S): 1,1,2-TRICHLOROETHANE

PRODUCT IDENTIFICATION: J.T. BAKER MSDS NUMBER: T4927
CAS NO.: 79-00-5
W515

MANUFACTURER(S): J T BAKER CHEMICAL CO

222 RED SCHOOL LANE
PHILLIPSBURG NEW JERSEY
U.S.A. 08865

Emergency Telephone: 908-859-2151
800-424-9300 (CHEMTREC)
800-424-8802 (NATIONAL RESPONSE CENTER)

DATE OF MSDS: 1 May 1989

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

T4927 -05 1,1,2-TRICHLOROETHANE PAGE: 1
EFFECTIVE: 05/01/89 ISSUED: 09/28/91

J.T.BAKER INC., 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: 1,1,2-TRICHLOROETHANE
COMMON SYNONYMS: VINYL TRICHLORIDE
CHEMICAL FAMILY: CHLORINATED HYDROCARBONS
FORMULA: CL2CHCH2CL
FORMULA WT.: 133.41
CAS NO.: 79-00-5

NIOSH/RTECS NO.: KJ3150000
PRODUCT USE: LABORATORY REAGENT
PRODUCT CODES: W515

PRECAUTIONARY LABELING

BAKER SAF-T-DATA* SYSTEM

HEALTH	-	2	MODERATE
FLAMMABILITY	-	1	SLIGHT
REACTIVITY	-	1	SLIGHT
CONTACT	-	3	SEVERE (LIFE)

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

U.S. PRECAUTIONARY LABELING

DANGER

CAUSES IRRITATION. MAY BE FATAL IF INHALED. HARMFUL IF SWALLOWED OR ABSORBED THROUGH SKIN. NOTE: REPORTED AS CAUSING CANCER IN LABORATORY ANIMALS. EXERCISE DUE CARE.

DO NOT GET IN EYES, ON SKIN, ON CLOTHING. DO NOT BREATHE VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF FIRE, USE WATER SPRAY, ALCOHOL FOAM, DRY CHEMICAL, OR CARBON DIOXIDE. FLUSH SPILL AREA WITH WATER SPRAY.

INTERNATIONAL LABELING

AVOID CONTACT WITH EYES. AFTER CONTACT WITH SKIN, WASH IMMEDIATELY WITH PLENTY OF WATER. KEEP CONTAINER TIGHTLY CLOSED.

CONTINUED ON PAGE: 2

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

T4927 -05
EFFECTIVE: 05/01/89

1,1,2-TRICHLOROETHANE

PAGE: 2
ISSUED: 09/28/91

PRECAUTIONARY LABELING (CONTINUED)

SAF-T-DATA* STORAGE COLOR CODE: BLUE (HEALTH)

SECTION II - COMPONENTS

COMPONENT	CAS NO.	WEIGHT %	OSHA/PEL	ACGIH/TLV
1,2-BUTYLENE OXIDE	106-88-7	<1	N/E	N/E
SEC-BUTYL ALCOHOL	78-92-2	<1	100 PPM	100 PPM
1,1,2-TRICHLOROETHANE	79-00-5	90-100	10 PPM	10 PPM

SECTION III - PHYSICAL DATA

BOILING POINT: 114 C (237 F) (AT 760 MM HG)	VAPOR PRESSURE (MMHG): 18.8 (20 C)
MELTING POINT: -35 C (-31 F) (AT 760 MM HG)	VAPOR DENSITY (AIR=1): 4.6
SPECIFIC GRAVITY: 1.44 (H2O=1)	EVAPORATION RATE: <1 (BUTYL ACETATE = 1)
SOLUBILITY(H2O): SLIGHT (0.1-1%)	% VOLATILES BY VOLUME: 100 (21 C)
PH: N/A	
ODOR THRESHOLD (P.P.M.): N/A	PHYSICAL STATE: LIQUID
COEFFICIENT WATER/OIL DISTRIBUTION: N/A	
APPEARANCE & ODOR: COLORLESS LIQUID. FAINT CHARACTERISTIC ODOR.	

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP): N/A	NFPA 704M RATING: 3-1-0
AUTOIGNITION TEMPERATURE: N/A	

CONTINUED ON PAGE: 3

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

T4927 -05
EFFECTIVE: 05/01/89

1,1,2-TRICHLOROETHANE

PAGE: 3
ISSUED: 09/28/91

SECTION IV - FIRE AND EXPLOSION HAZARD DATA (CONTINUED)

FLAMMABLE LIMITS: UPPER - 13.3 % LOWER - 8.4 %

FIRE EXTINGUISHING MEDIA

USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES

FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE.

UNUSUAL FIRE & EXPLOSION HAZARDS

NONE IDENTIFIED.

TOXIC GASES PRODUCED

HYDROGEN CHLORIDE, CHLORINE, PHOSGENE, CARBON MONOXIDE, CARBON DIOXIDE

EXPLOSION DATA-SENSITIVITY TO MECHANICAL IMPACT

NONE IDENTIFIED.

EXPLOSION DATA-SENSITIVITY TO STATIC DISCHARGE

NONE IDENTIFIED.

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 45 MG/M3 (10 PPM)

THE TLV LISTED DENOTES TLV (SKIN).

SHORT-TERM EXPOSURE LIMIT (STEL): NOT ESTABLISHED

PERMISSIBLE EXPOSURE LIMIT (PEL): 45 MG/M3 (10 PPM)

THE PEL LISTED DENOTES PEL (SKIN).

TOXICITY OF COMPONENTS

NO INFORMATION IS AVAILABLE

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

CONTINUED ON PAGE: 4

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

T4927 -05
EFFECTIVE: 05/01/89

1,1,2-TRICHLOROETHANE

PAGE: 4
ISSUED: 09/28/91

SECTION V - HEALTH HAZARD DATA (CONTINUED)

CARCINOGENICITY

SOME EXPERIMENTS WITH TEST ANIMALS INDICATED THAT THIS SUBSTANCE MAY BE ANTICIPATED TO BE A CARCINOGEN.

REPRODUCTIVE EFFECTS

NONE IDENTIFIED.

EFFECTS OF OVEREXPOSURE

INHALATION: IS HARMFUL MAY BE FATAL, HEADACHE, NAUSEA, VOMITING, DIZZINESS, DROWSINESS, IRRITATION OF UPPER RESPIRATORY TRACT, UNCONSCIOUSNESS

SKIN CONTACT: IRRITATION

EYE CONTACT: IRRITATION

SKIN ABSORPTION: RAPID ABSORPTION

INGESTION: NONE IDENTIFIED

CHRONIC EFFECTS: KIDNEY DAMAGE, LIVER DAMAGE

TARGET ORGANS

CENTRAL NERVOUS SYSTEM, EYES, LIVER, KIDNEYS, NOSE

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

NONE IDENTIFIED

PRIMARY ROUTES OF ENTRY

INHALATION, ABSORPTION, INGESTION, EYE CONTACT, SKIN CONTACT

EMERGENCY AND FIRST AID PROCEDURES

INGESTION: CALL A PHYSICIAN. IF SWALLOWED, DO NOT INDUCE VOMITING.

INHALATION: IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.

SKIN CONTACT: IN CASE OF CONTACT, IMMEDIATELY FLUSH SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. WASH CLOTHING BEFORE RE-USE.

CONTINUED ON PAGE: 5

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

T4927 -05
EFFECTIVE: 05/01/89

1,1,2-TRICHLOROETHANE

PAGE: 5
ISSUED: 09/28/91

SECTION V - HEALTH HAZARD DATA (CONTINUED)

EYE CONTACT: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

SARA/TITLE III HAZARD CATEGORIES AND LISTS

ACUTE: YES CHRONIC: YES FLAMMABILITY: NO PRESSURE: NO REACTIVITY: NO

EXTREMELY HAZARDOUS SUBSTANCE: NO

CERCLA HAZARDOUS SUBSTANCE: YES CONTAINS ETHANE, 1,1,2-TRICHLORO- (RQ - 1 LB)

SARA 313 TOXIC CHEMICALS: YES CONTAINS SEC-BUTYL ALCOHOL, 1,2-BUTYLENE OXIDE, AND 1,1,2-TRICHLOROETHANE
C02, C05, C06

GENERIC CLASS:
TSCA INVENTORY:

YES

SECTION VI - REACTIVITY DATA

STABILITY: STABLE

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, FLAME, OTHER SOURCES OF IGNITION

INCOMPATIBLES: STRONG OXIDIZING AGENTS, ALUMINUM, POTASSIUM

DECOMPOSITION PRODUCTS: HYDROGEN CHLORIDE, CHLORINE, PHOSGENE, CARBON
MONOXIDE, CARBON DIOXIDE

SECTION VII - SPILL & DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. STOP
LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS.
TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE
INTO CONTAINER FOR LATER DISPOSAL. FLUSH SPILL AREA WITH WATER.

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL
ENVIRONMENTAL REGULATIONS.

CONTINUED ON PAGE: 6

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

T4927 -05
EFFECTIVE: 05/01/89

1,1,2-TRICHLOROETHANE

PAGE: 6
ISSUED: 09/28/91

SECTION VII - SPILL & DISPOSAL PROCEDURES (CONTINUED)

EPA HAZARDOUS WASTE NUMBER: U227 (TOXIC WASTE)

SECTION VIII - INDUSTRIAL PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV
REQUIREMENTS.

RESPIRATORY PROTECTION: A CHEMICAL CARTRIDGE RESPIRATOR WITH ORGANIC VAPOR
CARTRIDGE IS RECOMMENDED. IF AIRBORNE CONCENTRATION
EXCEEDS CAPACITY OF CARTRIDGE RESPIRATOR, A
SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE
SUIT, PROPER GLOVES ARE RECOMMENDED.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA* STORAGE COLOR CODE: BLUE (HEALTH)

STORAGE REQUIREMENTS

KEEP CONTAINER TIGHTLY CLOSED. STORE IN SECURE POISON AREA.

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME: HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
(1,1,2-TRICHLOROETHANE)

HAZARD CLASS: ORM-E

UN/NA: NA9188 REPORTABLE QUANTITY: 1 LBS.

LABELS: NONE

REGULATORY REFERENCES: 49CFR 172.101; 173.500; 173.510

CONTINUED ON PAGE: 7

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER * (800) 424-8802

T4927 -05

1,1,2-TRICHLOROETHANE

PAGE: 7

EFFECTIVE: 05/01/89

ISSUED: 09/28/91

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION (CONTINUED)

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME: CHEMICALS, N.O.S. (NON-REGULATED)
MARINE POLLUTANTS: NO

AIR (I.C.A.O.)

PROPER SHIPPING NAME: CHEMICALS, N.O.S. (NON-REGULATED)

U.S. CUSTOMS HARMONIZATION NUMBER: 29031950100

N/A - NOT APPLICABLE OR NOT AVAILABLE
N/E - NOT ESTABLISHED

THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET MEETS THE REQUIREMENTS OF THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ACT AND REGULATIONS PROMULGATED THEREUNDER (29 CFR 1910.1200 ET. SEQ.) AND THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM. THIS DOCUMENT IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY A PERSON TRAINED IN, OR SUPERVISED BY A PERSON TRAINED IN, CHEMICAL HANDLING. THE USER IS RESPONSIBLE FOR DETERMINING THE PRECAUTIONS AND DANGERS OF THIS CHEMICAL FOR HIS OR HER PARTICULAR APPLICATION. DEPENDING ON USAGE, PROTECTIVE CLOTHING INCLUDING EYE AND FACE GUARDS AND RESPIRATORS MUST BE USED TO AVOID CONTACT WITH MATERIAL OR BREATHING CHEMICAL VAPORS/FUMES.

EXPOSURE TO THIS PRODUCT MAY HAVE SERIOUS ADVERSE HEALTH EFFECTS. THIS CHEMICAL MAY INTERACT WITH OTHER SUBSTANCES. SINCE THE POTENTIAL USES ARE SO VARIED, BAKER CANNOT WARN OF ALL OF THE POTENTIAL DANGERS OF USE OR INTERACTION WITH OTHER CHEMICALS OR MATERIALS. BAKER WARRANTS THAT THE CHEMICAL MEETS THE SPECIFICATIONS SET FORTH ON THE LABEL.

BAKER DISCLAIMS ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED WITH REGARD TO THE PRODUCT SUPPLIED HEREUNDER, ITS MERCHANTABILITY OR ITS FITNESS FOR A PARTICULAR PURPOSE.

THE USER SHOULD RECOGNIZE THAT THIS PRODUCT CAN CAUSE SEVERE INJURY AND EVEN DEATH, ESPECIALLY IF IMPROPERLY HANDLED OR THE KNOWN DANGERS OF USE ARE NOT HEEDDED. READ ALL PRECAUTIONARY INFORMATION. AS NEW DOCUMENTED GENERAL SAFETY INFORMATION BECOMES AVAILABLE, BAKER WILL PERIODICALLY REVISE THIS MATERIAL SAFETY DATA SHEET.

NOTE: CHEMTREC, CANUTEC, AND NATIONAL RESPONSE CENTER EMERGENCY TELEPHONE NUMBERS ARE TO BE USED ONLY IN THE EVENT OF CHEMICAL EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT INVOLVING CHEMICALS. ALL

CONTINUED ON PAGE: 8

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC * (800) 424-9300 -- NATIONAL RESPONSE CENTER * (800) 424-8802

T4927 -05
EFFECTIVE: 05/01/89

1,1,2-TRICHLOROETHANE

PAGE: 8
ISSUED: 09/28/91

NON-EMERGENCY QUESTIONS SHOULD BE DIRECTED TO CUSTOMER SERVICE (1-800-JTBAKER) FOR ASSISTANCE.

COPYRIGHT 1991 J.T.BAKER INC.
* TRADEMARKS OF J.T.BAKER INC.

APPROVED BY QUALITY ASSURANCE DEPARTMENT.

-- LAST PAGE --

11 ANSWER 1 OF 2

-> d all 3

L8 ANSWER 3 OF 9

*
* MSDS Canadian Centre for Occupational Health and Safety *
*

AN 289203 MSDS-CCOHS

PRODUCT NAME(S): ***TRICHLOROETHYLENE***

PRODUCT IDENTIFICATION: J.T. BAKER MSDS NUMBER: T4940
PRODUCT CODES: 9458,9473,5376,9455,9464,9454,9474

MANUFACTURER(S): J T BAKER CHEMICAL CO

222 RED SCHOOL LANE
PHILLIPSBURG NEW JERSEY
U.S.A. 08865

Emergency Telephone: 908-859-2151
800-424-9300 (CHEMTREC)
800-424-8802 (NATIONAL RESPONSE CENTER)

DATE OF MSDS: 1 May 1989

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

T4940 <05
EFFECTIVE: 05/01/89

TRICHLOROETHYLENE

PAGE: 1
ISSUED: 03/22/91

J.T.BAKER INC., 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

SECTION I - PRODUCT IDENTIFICATION

PRODUCT NAME: TRICHLOROETHYLENE
COMMON SYNONYMS: TRICHLOROETHENE; ETHINYL TRICHLORIDE; ACETYLENE
TRICHLORIDE; TCE
CHEMICAL FAMILY: CHLORINATED HYDROCARBONS
FORMULA: C2HCL3
FORMULA WT.: 131.40
CAS NO.: 79-01-6

NIOSH/RTECS NO.: KX4550000
PRCT USE: LABORATORY REAGENT
PRODUCT CODES: 9458, 9473, 5376, 9455, 9464, 9454, 9474

PRECAUTIONARY LABELING

BAKER SAF-T-DATA* SYSTEM

HEALTH	-	3	SEVERE (CANCER CAUSING)
FLAMMABILITY	-	1	SLIGHT
REACTIVITY	-	2	MODERATE
CONTACT	-	2	MODERATE

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

U.S. PRECAUTIONARY LABELING

WARNING

CAUSES IRRITATION. HARMFUL IF SWALLOWED OR INHALED. HEAT MAY CAUSE DECOMPOSITION AND GENERATE CORROSIVE VAPORS. NOTE: REPORTED AS CAUSING CANCER IN LABORATORY ANIMALS. EXERCISE DUE CARE.
DO NOT GET IN EYES, ON SKIN, ON CLOTHING. DO NOT BREATHE VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF SPILL, SOAK UP WITH SAND OR EARTH.

INTERNATIONAL LABELING

HARMFUL BY INHALATION AND IF SWALLOWED. POSSIBLE RISKS OF IRREVERSIBLE EFFECTS.

CONTINUED ON PAGE: 2

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

T4940 <05
EFFECTIVE: 05/01/89

TRICHLOROETHYLENE

PAGE: 2
ISSUED: 03/22/91

PRECAUTIONARY LABELING (CONTINUED)

KEEP OUT OF REACH OF CHILDREN. AVOID CONTACT WITH EYES.

SAF-T-DATA* STORAGE COLOR CODE: BLUE (HEALTH)

SECTION II - COMPONENTS

COMPONENT	CAS NO.	WEIGHT %	OSHA/PEL	ACGIH/TLV
TRICHLOROETHYLENE	79-01-6	99-100	50 PPM	50 PPM

SECTION III - PHYSICAL DATA

BOILING POINT: 87 C (188 F) (AT 760 MM HG)	VAPOR PRESSURE (MMHG): 58 (20 C)
MELTING POINT: -73 C (-99 F) (AT 760 MM HG)	VAPOR DENSITY (AIR=1): 4.53
SPECIFIC GRAVITY: 1.46 (H2O=1)	EVAPORATION RATE: N/A
SOLUBILITY(H2O): SLIGHT (0.1-1%)	% VOLATILES BY VOLUME: 100 (21 C)
PH: N/A	
ODOR THRESHOLD (P.P.M.): N/A	PHYSICAL STATE: LIQUID
COEFFICIENT WATER/OIL DISTRIBUTION: N/A	
APPEARANCE & ODOR: CLEAR, COLORLESS LIQUID. CHLOROFORM-LIKE ODOR.	

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP): N/A	NFPA 704M RATING: 2-1-0
AUTOIGNITION TEMPERATURE: N/A	

CONTINUED ON PAGE: 3

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

T4940 <05
EFFECTIVE: 05/01/89

TRICHLOROETHYLENE

PAGE: 3
ISSUED: 03/22/91

SECTION IV - FIRE AND EXPLOSION HAZARD DATA (CONTINUED)

FLAMMABLE LIMITS: UPPER - 10.5 % LOWER - 8.0 %

FIRE EXTINGUISHING MEDIA

USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES

FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE & EXPLOSION HAZARDS

GIVES OFF FLAMMABLE VAPORS. VAPORS MAY FORM EXPLOSIVE MIXTURE WITH AIR. CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE. CONTACT WITH STRONG OXIDIZERS MAY CAUSE FIRE. CONCENTRATED VAPORS CAN BE IGNITED BY HIGH INTENSITY HEAT SOURCE.

TOXIC GASES PRODUCED

HYDROGEN CHLORIDE, PHOSGENE, CARBON MONOXIDE, CARBON DIOXIDE

EXPLOSION DATA-SENSITIVITY TO MECHANICAL IMPACT

NONE IDENTIFIED.

EXPLOSION DATA-SENSITIVITY TO STATIC DISCHARGE

NONE IDENTIFIED.

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 270 MG/M3 (50 PPM)

SHORT-TERM EXPOSURE LIMIT (STEL): 1080 MG/M3 (200 PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): (100 PPM)

TOXICITY OF COMPONENTS

OR (RAT LD50 FOR TRICHLOROETHYLENE	3670 MG/KG
INTRAPERITONEAL MOUSE LD50 FOR TRICHLOROETHYLENE	1831 MG/KG
INTRAVENOUS MOUSE LD50 FOR TRICHLOROETHYLENE	34 MG/KG

CONTINUED ON PAGE: 4

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

T4940 <05
EFFECTIVE: 05/01/89

TRICHLOROETHYLENE

PAGE: 4
ISSUED: 03/22/91

SECTION V - HEALTH HAZARD DATA (CONTINUED)

INHALATION-4HR MOUSE LC50 FOR TRICHLOROETHYLENE 8450 PPM
CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

CARCINOGENICITY

TESTS ON LABORATORY ANIMALS INDICATE MATERIAL MAY BE CARCINOGENIC.

MUTAGENICITY

TESTS ON LABORATORY ANIMALS INDICATE MATERIAL MAY BE MUTAGENIC.

EFFECTS OF OVEREXPOSURE

INHALATION: HEADACHE, NAUSEA, VOMITING, DIZZINESS, NARCOSIS,
WEAKNESS, FATIGUE, IRRITATION OF UPPER RESPIRATORY TRACT,
NUMBNESS OF LIMBS, CENTRAL NERVOUS SYSTEM DEPRESSION,
PULMONARY EDEMA, UNCONSCIOUSNESS

SKIN CONTACT: IRRITATION, PROLONGED CONTACT MAY CAUSE DERMATITIS

EYE CONTACT: IRRITATION

SKIN ABSORPTION: NONE IDENTIFIED

INGESTION: NAUSEA, HEADACHES, DIZZINESS, CONFUSION, JAUNDICE,
GASTROINTESTINAL IRRITATION, CENTRAL NERVOUS SYSTEM
DEPRESSION, UNCONSCIOUSNESS

CHRONIC EFFECTS: DAMAGE TO LIVER, KIDNEYS, BLOOD, AND CENTRAL NERVOUS
SYSTEM DEPRESSION

TARGET ORGANS

RESPIRATORY SYSTEM, LUNGS, KIDNEYS, LIVER, BLOOD, HEART, CENTRAL NERVOUS
SYSTEM, SKIN

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

SECTION VI - REACTIVITY DATA

STABILITY: STABLE

HAZARDOUS POLYMERIZATION: MAY OCCUR

CONDITIONS TO AVOID: HEAT, FLAME, OTHER SOURCES OF IGNITION, LIGHT

INCOMPATIBLES: CHEMICALLY ACTIVE METALS, STRONG BASES, STRONG
OXIDIZING AGENTS, POWDERED METALS

DECOMPOSITION PRODUCTS: HYDROGEN CHLORIDE, PHOSGENE, CARBON MONOXIDE, CARBON
DIOXIDE

CONTINUED ON PAGE: 6

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

M A T E R I A L S A F E T Y D A T A S H E E T

24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151

CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

T4940 <05

TRICHLOROETHYLENE

PAGE: 6

EFFECTIVE: 05/01/89

ISSUED: 03/22/91

SECTION VII - SPILL & DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. STOP
LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS.
TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE
INTO CONTAINER FOR LATER DISPOSAL. FLUSH SPILL AREA WITH WATER.

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL
ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: U228 (TOXIC WASTE)

SECTION VIII - INDUSTRIAL PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV
REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE
CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS ABOVE 50
PPM, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE

PROPER SHIPPING NAME: TRICHLOROETHYLENE

HAZARD CLASS: 6.1

UN: UN1710

PACKAGING GROUP: III

LABELS: HARMFUL - STOW AWAY FROM FOOD STUFFS

REGULATORY REFERENCES: 49CFR 172.101; 173.6; PART 175; ICAO/IATA

S. CUSTOMS HARMONIZATION NUMBER: 29032200008

N/A - NOT APPLICABLE OR NOT AVAILABLE

N/E - NOT ESTABLISHED

THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET MEETS THE REQUIREMENTS OF THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ACT AND REGULATIONS PROMULGATED THEREUNDER (29 CFR 1910.1200 ET. SEQ.) AND THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM. THIS DOCUMENT IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY A PERSON TRAINED IN, OR SUPERVISED BY A PERSON TRAINED IN, CHEMICAL HANDLING. THE USER IS RESPONSIBLE FOR DETERMINING THE PRECAUTIONS AND DANGERS OF THIS CHEMICAL FOR HIS OR HER PARTICULAR APPLICATION. DEPENDING ON USAGE, PROTECTIVE CLOTHING INCLUDING EYE AND FACE GUARDS AND RESPIRATORS MUST BE USED TO AVOID CONTACT WITH MATERIAL OR BREATHING CHEMICAL VAPORS/FUMES.

EXPOSURE TO THIS PRODUCT MAY HAVE SERIOUS ADVERSE HEALTH EFFECTS. THIS

CONTINUED ON PAGE: 8

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

M A T E R I A L S A F E T Y D A T A S H E E T

24-HOUR EMERGENCY TELEPHONE -- (201) 859-2151

CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

T4940 <05

TRICHLOROETHYLENE

PAGE: 8

EFFECTIVE: 05/01/89

ISSUED: 03/22/91

CHEMICAL MAY INTERACT WITH OTHER SUBSTANCES. SINCE THE POTENTIAL USES ARE SO VARIED, BAKER CANNOT WARN OF ALL OF THE POTENTIAL DANGERS OF USE OR INTERACTION WITH OTHER CHEMICALS OR MATERIALS. BAKER WARRANTS THAT THE CHEMICAL MEETS THE SPECIFICATIONS SET FORTH ON THE LABEL. BAKER DISCLAIMS ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED WITH REGARD TO THE PRODUCT SUPPLIED HEREUNDER, ITS MERCHANTABILITY OR ITS FITNESS FOR A PARTICULAR PURPOSE.

THE USER SHOULD RECOGNIZE THAT THIS PRODUCT CAN CAUSE SEVERE INJURY AND EVEN DEATH, ESPECIALLY IF IMPROPERLY HANDLED OR THE KNOWN DANGERS OF USE ARE NOT HEEDED. READ ALL PRECAUTIONARY INFORMATION. AS NEW DOCUMENTED GENERAL SAFETY INFORMATION BECOMES AVAILABLE, BAKER WILL PERIODICALLY REVISE THIS MATERIAL SAFETY DATA SHEET.

NO (CHEMTREC, CANUTEC, AND NATIONAL RESPONSE CENTER EMERGENCY TELEPHONE NUMBERS ARE TO BE USED ONLY IN THE EVENT OF CHEMICAL EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT INVOLVING CHEMICALS. ALL NON-EMERGENCY QUESTIONS SHOULD BE DIRECTED TO CUSTOMER SERVICE

OHS24940

MATERIAL SAFETY DATA SHEET

OCCUPATIONAL HEALTH SERVICES, INC.
11 WEST 42ND STREET, 12TH FLOOR
NEW YORK, NEW YORK 10036
1-800-445-MSDS (1-800-445-6737) OR
1-212-789-3535

FOR EMERGENCY SOURCE INFORMATION
CONTACT: 1-615-366-2000

SUBSTANCE IDENTIFICATION

CAS NUMBER: 75-01-4
RTECS NUMBER: KU9625000

SUBSTANCE: VINYL CHLORIDE

TRADE NAMES/SYNONYMS:

CHLOROETHYLENE; CHLOROETHENE; CHLORETHENE; TROVIDUR; ETHYLENE MONOCHLORIDE;
MONOCHLOROETHYLENE; EXON 470; MONOCHLORO ETHENE; VINYL CHLORIDE MONOMER;
VINYL CHLORIDE, INHIBITED; STCC 4905792; RCRA U043; UN 1086; C2H3CL;
OHS24940

CHEMICAL FAMILY:

HALOGEN COMPOUND, ALIPHATIC

MOLECULAR FORMULA: C-H2-C-H-CL

MOLECULAR WEIGHT: 62.50

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=3 REACTIVITY=2 PERSISTENCE=3
NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=4 REACTIVITY=1

COMPONENTS AND CONTAMINANTS

COMPONENT: VINYL CHLORIDE
CAS# 75-01-4

PERCENT: >99.9

OTHER CONTAMINANTS: MAY CONTAIN TRACES OF PHENOL OR OTHER INHIBITORS

EXPOSURE LIMITS:

VINYL CHLORIDE:

1.0 PPM OSHA TWA; 5 PPM OSHA 15 MINUTE CEILING;

0.5 PPM OSHA ACTION LEVEL AS AN 8 HOUR TWA

5 PPM ACGIH TWA

ACGIH A1-CONFIRMED HUMAN CARCINOGEN.

LOWEST FEASIBLE LIMIT NIOSH RECOMMENDED EXPOSURE CRITERIA

MEASUREMENT METHOD: CHARCOAL TUBE (2); CARBON DISULFIDE; GAS CHROMATOGRAPHY
WITH FLAME IONIZATION DETECTION; (NIOSH VOL. III # 1007).

1 POUND CERCLA SECTION 103 REPORTABLE QUANTITY

SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING

SUBJECT TO CALIFORNIA PROPOSITION 65 CANCER AND/OR REPRODUCTIVE TOXICITY

WARNING AND RELEASE REQUIREMENTS- (FEBRUARY 27, 1987)

PHYSICAL DATA

DESCRIPTION: COLORLESS GAS WITH A MILD, SWEET ODOR.

BOILING POINT: 9 F (-13 C) MELTING POINT: -245 F (-154 C)

SPECIFIC GRAVITY: 0.9106 VAPOR PRESSURE: 2515.6 MMHG @ 21.1 C

SOLUBILITY IN WATER: 0.25% ODOR THRESHOLD: 260 PPM VAPOR DENSITY: 2.2

SOLVENT SOLUBILITY: SOLUBLE IN ALCOHOL, ETHER, CARBON TETRACHLORIDE, BENZENE.

VISCOSITY: 0.01072 CP @ 20 C (GAS); 0.280 CP @ -20 C (LIQUID)

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
DANGEROUS FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

DANGEROUS EXPLOSION HAZARD WHEN EXPOSED TO HEAT OR FLAME.

VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL A CONSIDERABLE DISTANCE TO A SOURCE OF IGNITION AND FLASH BACK.

VAPOR-AIR MIXTURES ARE EXPLOSIVE.

DUE TO LOW ELECTROCONDUCTIVITY OF THE SUBSTANCE, FLOW OR AGITATION MAY GENERATE ELECTROSTATIC CHARGES RESULTING IN SPARKS WITH POSSIBLE IGNITION.

FLASH POINT: -108 F (-78 C) UPPER EXPLOSIVE LIMIT: 33%

LOWER EXPLOSIVE LIMIT: 3.6% AUTOIGNITION TEMP.: 882 F (472 C)

FIREFIGHTING MEDIA:
DRY CHEMICAL OR CARBON DIOXIDE
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).

FIREFIGHTING:
MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT WITHOUT RISK. FOR MASSIVE FIRE IN CARGO AREA, USE UNMANNED HOSE HOLDER OR MONITOR NOZZLES; IF THIS IS IMPOSSIBLE, WITHDRAW FROM AREA AND LET FIRE BURN. WITHDRAW IMMEDIATELY IN CASE OF RISING SOUND FROM VENTING SAFETY DEVICE OR ANY DISCOLORATION OF TANK DUE TO FIRE. COOL CONTAINER WITH WATER USING UNMANNED DEVICE UNTIL WELL AFTER FIRE IS OUT. LET TANK, TANK CAR OR TANK TRUCK BURN UNLESS LEAK CAN BE STOPPED; WITH SMALLER TANKS OR CYLINDERS, EXTINGUISH/ISOLATE FROM OTHER FLAMMABLES. ISOLATE FOR 1/2 MILE IN ALL DIRECTIONS IF TANK, RAIL CAR OR TANK TRUCK IS INVOLVED IN FIRE (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5, GUIDE PAGE 17).

EXTINGUISH ONLY IF FLOW CAN BE STOPPED; USE WATER IN FLOODING QUANTITIES AS FOG. COOL CONTAINERS WITH FLOODING AMOUNTS OF WATER, APPLY FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING TOXIC VAPORS, KEEP UPWIND. EVACUATE TO A RADIUS OF 2500 FEET FOR UNCONTROLLABLE FIRES. CONSIDER EVACUATION OF DOWNWIND AREA IF MATERIAL IS LEAKING.

STOP FLOW OF GAS (NFPA 325M, FIRE HAZARD PROPERTIES OF FLAMMABLE LIQUIDS, GASES, AND VOLATILE SOLIDS, 1984).

TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49 CFR 172.101:
FLAMMABLE GAS

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49 CFR 172.101 AND
SUBPART E:
FLAMMABLE GAS

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: 49 CFR 173.304;
49 CFR 173.314 AND 49 CFR 173.315
EXCEPTIONS: 49 CFR 173.306

FINAL RULE ON HAZARDOUS MATERIALS REGULATIONS (HMR, 49 CFR PARTS 171-180),
DOCKET NUMBERS HM-181, HM-181A, HM-181B, HM-181C, HM-181D AND HM-204.
EFFECTIVE DATE OCTOBER 1, 1991. HOWEVER, COMPLIANCE WITH THE REGULATIONS IS
AUTHORIZED ON AND AFTER JANUARY 1, 1991. (55 FR 52402, 12/21/90)

EXCEPT FOR EXPLOSIVES, INHALATION HAZARDS, AND INFECTIOUS SUBSTANCES, THE
EFFECTIVE DATE FOR HAZARD COMMUNICATION REQUIREMENTS IS EXTENDED TO
OCTOBER 1, 1993. (56 FR 47158, 10/18/91)

U.S. DEPARTMENT OF TRANSPORTATION SHIPPING NAME-ID NUMBER, 49 CFR 172.101:
VINYL CHLORIDE, INHIBITED-UN 1086

U.S. DEPARTMENT OF TRANSPORTATION HAZARD CLASS OR DIVISION, 49 CFR 172.101:
2.1 - FLAMMABLE GAS

U.S. DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS, 49 CFR 172.101
AND SUBPART E:
FLAMMABLE GAS

U.S. DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS:
EXCEPTIONS: 49 CFR 173.306
NON-BULK PACKAGING: 49 CFR 173.304
BULK PACKAGING: 49 CFR 173.314 AND 49 CFR 173.315

U.S. DEPARTMENT OF TRANSPORTATION QUANTITY LIMITATIONS 49 CFR 172.101:
PASSENGER AIRCRAFT OR RAILCAR: FORBIDDEN
CARGO AIRCRAFT ONLY: 150 KG

TOXICITY

VINYL CHLORIDE:

TOXICITY DATA: 18 PPH/15 MINUTES INHALATION-RAT LC50; 200 PPM/18 MINUTES INHALATION-RAT LC50; 500 MG/KG ORAL-RAT LD50; MUTAGENIC DATA (RTECS); REPRODUCTIVE EFFECTS DATA (RTECS); TUMORIGENIC DATA (RTECS).

CARCINOGEN STATUS: OSHA CARCINOGEN; KNOWN HUMAN CARCINOGEN (NTP); HUMAN SUFFICIENT EVIDENCE, ANIMAL SUFFICIENT EVIDENCE (IARC GROUP-1). STUDIES SHOW OCCUPATIONAL EXPOSURE RESULTED IN A SIGNIFICANT INCREASE IN ANGIOSARCOMAS OF THE LIVER, AND ALSO TUMORS OF THE BRAIN, LUNG, AND HEMATOPOIETIC SYSTEMS. VINYL CHLORIDE WAS CARCINOGENIC IN RATS, MICE, AND HAMSTERS FOLLOWING ORAL AND INHALATION EXPOSURE, PRODUCING ANGIOSARCOMAS OF THE LIVER AND ALSO TUMORS AT VARIOUS SITES, AND WAS CARCINOGENIC IN RATS FOLLOWING PRENATAL EXPOSURE.

LOCAL EFFECTS: IRRITANT- SKIN, EYE.

ACUTE TOXICITY LEVEL: TOXIC BY INGESTION; RELATIVELY NON-TOXIC BY INHALATION.

TARGET EFFECTS: CENTRAL NERVOUS SYSTEM DEPRESSANT. POISONING MAY AFFECT THE BLOOD, LIVER, AND LYMPHATIC AND RESPIRATORY SYSTEMS.

ADDITIONAL DATA: STIMULANTS SUCH AS EPINEPHRINE MAY INDUCE VENTRICULAR FIBRILLATION.

 HEALTH EFFECTS AND FIRST AID

INHALATION:

VINYL CHLORIDE:

NARCOTIC/CARCINOGEN.

ACUTE EXPOSURE- MAY BE IRRITATING. EXPOSURE TO 1000-16,000 PPM MAY CAUSE CENTRAL NERVOUS SYSTEM DEPRESSION WITH DROWSINESS, VERTIGO, STAGGERING GAIT, TINGLING AND NUMBNESS OF HANDS AND FEET, IMPAIRED HEARING AND VISION, CARDIAC ARRHYTHMIAS AND POSSIBLY UNCONSCIOUSNESS; 20,000-25,000 PPM FOR 3-5 MINUTES MAY CAUSE DIZZINESS, LIGHTHEADEDNESS, DISORIENTATION, NAUSEA AND BURNING SENSATION OF THE SOLES OF THE FEET; AND 120,000 PPM MAY BE FATAL. ADDITIONAL EFFECTS MAY INCLUDE NARCOLEPSY, HEADACHE, UNDUE FATIGUE, MUSCLE AND JOINT PAIN, DYSPNEA, AND ANESTHESIA. DEATH MAY BE DUE TO RESPIRATORY PARALYSIS WITH CARDIAC ARREST. HUMAN AND ANIMAL PATHOLOGIC REPORTS SHOW PULMONARY EDEMA, HYPEREMIA OF KIDNEYS AND LIVER, AND HEPATIC DEGENERATION.

CHRONIC EXPOSURE- REPEATED EXPOSURE MAY RESULT IN DOSE-RELATED SENSORY DISORDERS, AUTONOMIC NERVOUS SYSTEM POLYNEURITIS, SPASTIC ANGIOEURITIS, LEUKOPENIA, THROMBOCYTOPENIA, SPLENOMEGALY, HEPATITIS-LIKE LIVER CHANGES, LIVER MALFUNCTION WITH PORTAL FIBROSIS, IMPOTENCE AND PULMONARY INSUFFICIENCY. WORKERS INVOLVED IN THE POLYMERIZATION PROCESS MAY EXHIBIT A PECULIAR TRIAD OF SYMPTOMS: MODIFICATION OF PERIPHERAL CIRCULATION RESULTING IN PALLOR, CYANOSIS, AND THEN REDNESS (RAYNAUD'S PHENOMENON); SKELETAL CHANGES OF DISTAL PHALANGES (ACRO-OSTEOLYSIS); AND SCLERODERMA LIKE SKIN CHANGES. PSEUDO-CLUBBING OF THE FINGERS MAY ALSO OCCUR. OCCUPATIONAL EXPOSURE HAS PRODUCED ANGIOSARCOMAS OF THE LIVER AND IS ASSOCIATED WITH TUMOR PRODUCTION AT OTHER SITES. ANIMAL STUDIES SHOW THAT VINYL CHLORIDE IS CARCINOGENIC IN RATS FOLLOWING PRENATAL EXPOSURE. ONE STUDY SUGGESTED AN INCREASED FETAL MORTALITY DUE TO EXPOSURE OF THE FATHERS TO VINYL CHLORIDE. SEVERAL STUDIES HAVE REPORTED AN INCREASED RATE OF BIRTH DEFECTS, ESPECIALLY CENTRAL NERVOUS SYSTEM ANOMALIES, IN THE CHILDREN OF PARENTS RESIDING IN COMMUNITIES WHERE VINYL CHLORIDE PRODUCTION AND POLYMERIZATION PLANTS ARE LOCATED.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. MAINTAIN AIRWAY AND BLOOD PRESSURE AND ADMINISTER OXYGEN IF AVAILABLE. KEEP AFFECTED PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. ADMINISTRATION OF OXYGEN SHOULD BE PERFORMED BY QUALIFIED PERSONNEL. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:
VINYL CHLORIDE:
IRRITANT.

ACUTE EXPOSURE- CONTACT MAY CAUSE IRRITATION WITH REDNESS AND PAIN. DUE TO RAPID EVAPORATION, THE LIQUID MAY CAUSE FROSTBITE WITH REDNESS, TINGLING, AND PAIN OR NUMBNESS. IN MORE SEVERE CASES, THE SKIN MAY BECOME HARD AND WHITE AND DEVELOP BLISTERS.

CHRONIC EXPOSURE- WORKERS HANDLING VINYL CHLORIDE HAVE EXHIBITED A PECULIAR TRIAD OF SYMPTOMS: RAYNAUD'S PHENOMENON, ACRO-OSTEOLYSIS, AND SCLERODERMA LIKE SKIN CHANGES. REPEATED OR PROLONGED EXPOSURE TO IRRITANTS MAY CAUSE DERMATITIS.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS.

IN CASE OF FROSTBITE, WARM AFFECTED SKIN IN WARM WATER AT A TEMPERATURE OF 107 F. IF WARM WATER IS NOT AVAILABLE OR IMPRACTICAL TO USE, GENTLY WRAP AFFECTED PART IN BLANKETS. ENCOURAGE VICTIM TO EXERCISE AFFECTED PART WHILE IT IS BEING WARMED. ALLOW CIRCULATION TO RETURN NATURALLY (MATHESON GAS, 6TH ED.). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:
VINYL CHLORIDE:
IRRITANT.

ACUTE EXPOSURE- CONTACT MAY CAUSE IMMEDIATE AND SEVERE IRRITATION, AND CORNEAL INJURY WITH COMPLETE RECOVERY IN 48 HOURS. DUE TO RAPID EVAPORATION, THE LIQUID MAY CAUSE FROSTBITE WITH REDNESS, PAIN AND BLURRED VISION.

CHRONIC EXPOSURE- REPEATED OR PROLONGED EXPOSURE TO IRRITANTS MAY CAUSE CONJUNCTIVITIS.

FIRST AID- IMMEDIATELY WASH THE EYES WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). IF FROSTBITE IS PRESENT, WARM WATER MAY BE PREFERRED. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:
VINYL CHLORIDE:
CARCINOGEN/TOXIC.

ACUTE EXPOSURE- THE REPORTED LETHAL DOSE IN RATS IS 500 MG/KG. THE SYMPTOMS WERE NOT REPORTED. IF THE LIQUID IS SWALLOWED, FROSTBITE DAMAGE TO THE LIPS, MOUTH AND MUCOUS MEMBRANES MAY OCCUR.

CHRONIC EXPOSURE- ORAL ADMINISTRATION TO RATS, MICE, AND HAMSTERS RESULTED IN TUMOR PRODUCTION AT VARIOUS SITES, INCLUDING ANGIOSARCOMAS OF THE LIVER.

FIRST AID- IF EXTENSIVE VOMITING HAS NOT OCCURRED, THE SUBSTANCE SHOULD BE REMOVED BY EMESIS OR GASTRIC LAVAGE PROVIDED THAT THE PATIENT IS CONSCIOUS AND CONVULSIONS ARE NOT PRESENT. KEEP HEAD BELOW HIPS DURING VOMITING TO PREVENT ASPIRATION. DO NOT ATTEMPT TO MAKE AN UNCONSCIOUS PERSON VOMIT. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY (DREISBACH, HANDBOOK OF POISONING, 12TH ED.). TREATMENT SHOULD BE PERFORMED BY QUALIFIED MEDICAL PERSONNEL.

ANTIDOTE:

NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

REACTIVITY:

FORMS UNSTABLE PEROXIDES WHEN EXPOSED TO AIR WHICH MAY INITIATE POLYMERIZATION. MAY ALSO POLYMERIZE ON EXPOSURE TO HEAT OR LIGHT.

INCOMPATIBILITIES:

VINYL CHLORIDE:

ACETYLIDE-FORMING MATERIALS: MAY FORM EXPLOSIVE COMPOUNDS.

ALUMINUM: MAY CAUSE POLYMERIZATION.

COPPER AND ALLOYS: MAY FORM EXPLOSIVE COMPOUNDS.

IRON: MAY CORRODE IN THE PRESENCE OF WATER.

MONEL: MAY FORM EXPLOSIVE COMPOUND.

NITROGEN OXIDES: EXPLODES.

OXIDIZERS (STRONG): FIRE AND EXPLOSION HAZARD.

PEROXIDES: MAY INITIATE POLYMERIZATION.

STEEL: MAY CORRODE IN THE PRESENCE OF WATER.

DECOMPOSITION:

THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE HIGHLY TOXIC FUMES OF PHOSGENE, TOXIC AND CORROSIVE FUMES OF CHLORIDES, AND OXIDES OF CARBON.

POLYMERIZATION:

POLYMERIZATION OCCURS ON EXPOSURE TO SUNLIGHT, HEAT, OR AIR. THE PRESENCE OF IMPURITIES MAY RESULT IN EXOTHERMIC SELF-POLYMERIZATION, GENERATING SUFFICIENT HEAT AND PRESSURE TO RUPTURE THE CONTAINER.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

STORAGE

STORE IN ACCORDANCE WITH 29 CFR 1910.101.

PROTECT AGAINST PHYSICAL DAMAGE. OUTSIDE OR DETACHED STORAGE IS PREFERABLE.

INSIDE STORAGE SHOULD BE IN A COOL, WELL-VENTILATED, NON-COMBUSTIBLE LOCATION AWAY FROM ALL POSSIBLE SOURCES OF IGNITION. SEPARATE FROM OXIDIZING MATERIALS. (NFPA 49, HAZARDOUS CHEMICALS DATA, 1975).

BONDING AND GROUNDING: SUBSTANCES WITH LOW ELECTROCONDUCTIVITY, WHICH MAY BE IGNITED BY ELECTROSTATIC SPARKS, SHOULD BE STORED IN CONTAINERS WHICH MEET THE BONDING AND GROUNDING GUIDELINES SPECIFIED IN NFPA 77-1983, RECOMMENDED PRACTICE ON STATIC ELECTRICITY.

DISPOSAL

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40CFR 262. EPA HAZARDOUS WASTE NUMBER U043.

VINYL CHLORIDE - REGULATORY LEVEL: 0.2 MG/L

MATERIALS WHICH CONTAIN THE ABOVE SUBSTANCE AT OR ABOVE THE REGULATORY LEVEL MEET THE EPA CHARACTERISTIC OF TOXICITY, AND MUST BE DISPOSED OF IN ACCORDANCE WITH 40 CFR PART 262. EPA HAZARDOUS WASTE NUMBER D043.

CONDITIONS TO AVOID

MATERIAL IS EXTREMELY FLAMMABLE; AVOID CONTACT WITH HEAT, SPARKS, FLAMES OR OTHER SOURCES OF IGNITION. CONTENTS ARE UNDER PRESSURE; CONTAINERS MAY RUPTURE VIOLENTLY AND TRAVEL A CONSIDERABLE DISTANCE.

SPILL AND LEAK PROCEDURES

WATER SPILL:

THE CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986 (PROPOSITION 65) PROHIBITS CONTAMINATING ANY KNOWN SOURCE OF DRINKING WATER WITH SUBSTANCES KNOWN TO CAUSE CANCER AND/OR REPRODUCTIVE TOXICITY.

OCCUPATIONAL SPILL:

SHUT OFF IGNITION SOURCES. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. ISOLATE AREA UNTIL GAS HAS DISPERSED. NO SMOKING, FLAMES OR FLARES IN HAZARD AREA! KEEP UNNECESSARY PEOPLE AWAY; ISOLATE HAZARD AREA AND DENY ENTRY. VENTILATE CLOSED SPACES BEFORE ENTERING.

REPORTABLE QUANTITY (RQ): 1 POUND

THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

PROTECTIVE EQUIPMENT

VENTILATION:

PROVIDE LOCAL EXHAUST OR PROCESS ENCLOSURE VENTILATION TO MEET THE PUBLISHED EXPOSURE LIMITS. VENTILATION EQUIPMENT MUST BE EXPLOSION-PROOF.

VINYL CHLORIDE:

VENTILATION SHOULD MEET THE REQUIREMENTS IN 29 CFR 1910.1017(F).

RESPIRATOR:

THE FOLLOWING RESPIRATORS ARE THE MINIMUM LEGAL REQUIREMENTS AS SET FORTH BY THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION FOUND IN 29 CFR 1910, SUBPART Z.

REQUIRED RESPIRATORS FOR VINYL CHLORIDE

ATMOSPHERIC CONCENTRATIONS OF VINYL CHLORIDE

UNKNOWN OR ABOVE 3600 PPM

NOT OVER 3600 PPM

NOT OVER 1000 PPM

NOT OVER 100 PPM

NOT OVER 25 PPM

REQUIRED APPARATUS

OPEN-CIRCUIT, SELF CONTAINED BREATHING APPARATUS, PRESSURE DEMAND TYPE, WITH FULL FACEPIECE

COMBINATION TYPE 'C' SUPPLIED AIR RESPIRATOR, PRESSURE DEMAND TYPE, WITH A FULL OR HALF FACEPIECE AND AUXILIARY SELF-CONTAINED AIR SUPPLY;

OR

COMBINATION TYPE SUPPLIED AIR RESPIRATOR, CONTINUOUS FLOW TYPE, WITH A FULL OR HALF FACEPIECE, AND AUXILIARY SELF-CONTAINED AIR SUPPLY.

TYPE 'C' SUPPLIED AIR RESPIRATOR, CONTINUOUS FLOW TYPE, WITH A FULL OR HALF FACEPIECE, HELMET OR HOOD.

COMBINATION TYPE 'C' SUPPLIED AIR RESPIRATOR, DEMAND TYPE, WITH A FULL FACEPIECE, AND AUXILIARY SELF-CONTAINED AIR SUPPLY;

OR

OPEN-CIRCUIT SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE, IN DEMAND MODE;

OR

TYPE 'C' SUPPLIED AIR RESPIRATOR, DEMAND TYPE, WITH FULL FACEPIECE.

A POWERED AIR PURIFYING RESPIRATOR WITH HOOD, HELMET, FULL OR HALF FACEPIECE, AND A CANISTER WHICH PROVIDES A SERVICE LIFE OF AT LEAST 4 HOURS FOR

CONCENTRATIONS OF VINYL CHLORIDE
UP TO 25 PPM;

OR

GAS MASK, FRONT- OR BACK-MOUNTED
CANISTER WHICH PROVIDES A SERVICE
LIFE OF AT LEAST 4 HOURS FOR
CONCENTRATIONS OF VINYL CHLORIDE
UP TO 25 PPM.

NOT OVER 10 PPM

COMBINATION TYPE 'C' SUPPLIED AIR
RESPIRATOR, WITH A HALF FACEPIECE
AND AUXILIARY SELF-CONTAINED AIR
SUPPLY;

OR

TYPE 'C' SUPPLIED-AIR RESPIRATOR,
DEMAND TYPE, WITH A HALF
FACEPIECE;

OR

ANY CHEMICAL CARTRIDGE RESPIRATOR
WITH AN ORGANIC VAPOR CARTRIDGE
WHICH PROVIDES A SERVICE LIFE OF
AT LEAST 1 HOUR FOR
CONCENTRATIONS OF VINYL CHLORIDE
UP TO 10 PPM.

ENTRY INTO UNKNOWN CONCENTRATIONS OR CONCENTRATIONS GREATER THAN 36,000 PPM
(LOWER EXPLOSION LIMIT) MAY BE MADE ONLY FOR THE PURPOSES OF LIFE RESCUE;

AND

ENTRY INTO CONCENTRATIONS OF LESS THAN 36,000 PPM, BUT GREATER THAN 3600 PPM
MAY BE MADE ONLY FOR THE PURPOSES OF LIFE RESCUE, FIREFIGHTING OR SECURING
EQUIPMENT SO AS TO PREVENT A GREATER HAZARD OF RELEASE OF VINYL CHLORIDE.

THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS
BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO
CHEMICAL HAZARDS, OR NIOSH CRITERIA DOCUMENTS.

THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND
IN THE WORK PLACE, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND
BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND
HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

VINYL CHLORIDE (AT ANY DETECTABLE CONCENTRATION):

SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN
PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

SUPPLIED-AIR RESPIRATOR WITH FULL FACEPIECE OPERATED IN
PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE IN COMBINATION
WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED
IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

ESCAPE- AIR-PURIFYING FULL FACEPIECE RESPIRATOR (GAS MASK) WITH A CHIN-STYLE
OR FRONT- OR BACK-MOUNTED CANISTER PROVIDING PROTECTION AGAINST
VINYL CHLORIDE.

ESCAPE-TYPE SELF-CONTAINED BREATHING APPARATUS.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITIONS:

ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

CLOTHING:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMENT TO PREVENT ANY POSSIBILITY OF SKIN CONTACT WITH THIS SUBSTANCE.

VINYL CHLORIDE:

PROTECTIVE CLOTHING SHOULD MEET THE REQUIREMENTS FOR PROTECTIVE GARMENTS IN 29 CFR 1910.1017(H).

GLOVES:

FOR GAS: WEAR IMPERVIOUS GLOVES. SPECIFIC TYPE OF GLOVE MAY BE TESTED AND/OR RECOMMENDED BY MANUFACTURER.

FOR COMPRESSED LIQUID: WEAR FULL PROTECTIVE, COLD INSULATING GLOVES.

VINYL CHLORIDE:

PROTECTIVE GLOVES SHOULD MEET THE REQUIREMENTS FOR PROTECTIVE GARMENTS IN 29 CFR 1910.1017(H).

EYE PROTECTION:

EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE.

EMERGENCY WASH FACILITIES:

WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES AND/OR SKIN MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN AND QUICK DRENCH SHOWER WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

VINYL CHLORIDE:

PROTECTIVE EYE EQUIPMENT SHOULD MEET THE REQUIREMENTS FOR PROTECTIVE GARMENTS IN 29 CFR 1910.1017(H).

AUTHORIZED BY- OCCUPATIONAL HEALTH SERVICES, INC.
CREATION DATE: 10/16/84 REVISION DATE: 11/12/91

OHS24940

75-01-4

VINYL CHLORIDE

Copyright 1991 Occupational Health Services, Inc. All Rights Reserved.
Licensed to: fluor daniel inc.
To make unlimited paper copies for internal distribution and use only.

APPENDIX B
HOSPITAL EMERGENCY ROUTE MAP

